coats®

950/1025/1050/1055
950 ProRacer
Computer Wheel Balancers

Service Manual and Troubleshooting Guide

HENNESSY INDUSTRIES, INC.
P.O. Box 3002, 1601 J. P. Hennessy Drive, LaVergne, TN USA 37086 615/641-7533 800/688-6359
HENNESSY INDUSTRIES INC. Manufacturer of AMMCO®, COATS® and BADA® Automotive Service Equipment and Tools.
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*This manual has been updated to include all related models. Items that are new are high lighted by an asterick (*) for your convenience.

IMPORTANT SAFETY INSTRUCTIONS

READ ALL INSTRUCTIONS

1. Eye and face protection recommendations:

   "Protective eye and face equipment is required to be used where there is a reasonable probability of injury that can be prevented by the use of such equipment." O.S.H.A. 1910.133(a) Protective goggles, safety glasses, or a face shield must be provided by the owner and worn by the operator of the equipment. Care should be taken to see that all eye and face safety precautions are followed by the operator. ALWAYS WEAR SAFETY GLASSES. Everyday glasses only have impact resistant lenses, they are not safety glasses.

2. Do not disable hood safety interlock system, or in any way shortcut safety controls and operations.

3. Be sure that wheels are mounted properly, the hub nut engages the arbor for not less than four (4) turns, and the hub nut is firmly tightened before spinning the wheel.

4. Read and understand this manual before operating. Abuse and misuse will shorten the functional life.

5. Be sure the balancer is properly connected to the power supply and electrically grounded.

6. Do not operate equipment with a damaged cord or if the equipment has been dropped or damaged – until it has been examined by a qualified serviceman.

7. Do not let cord hang over edge of table, bench, or counter or come in contact with hot manifolds or moving fan blades.

8. If an extension cord is necessary, a cord with a current rating equal to or more than that of the equipment should be used. Cords rated for less current than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.

9. Keep guards and safety features in place and in working order.

10. Wear proper clothing. Safety toe, non-slip footwear and protective hair covering to contain hair is recommended. Do not wear jewelry, loose clothing, neckties, or gloves when operating the balancer.

11. Keep work area clean and well lighted. Cluttered and/or dark areas invite accidents.

12. Avoid dangerous environments. Do not use power tools or electrical equipment in damp or wet locations, or expose them to rain.

13. Avoid unintentional starting. Be sure the balancer is turned off before servicing.

14. Disconnect the balancer before servicing.

15. Use only manufacturer's recommended accessories. Improper accessories may result in personal injury or property damage.

16. Repair or replace any part that is damaged or worn and that may cause unsafe balancer operation. Do not operate damaged equipment until it has been examined by a qualified service technician.

17. Never overload or stand on the balancer.

18. Do not allow untrained persons to operate machinery.

19. To reduce the risk of fire, do not operate equipment in the vicinity of open containers or flammable liquids (gasoline).

20. Adequate ventilation should be provided when working on operating internal combustion engines.

21. Keep hair, loose clothing, fingers, and all parts of body away from moving parts.

22. Use equipment only as described in this manual.

23. Use only manufacturer's recommended attachments.

SAVE THESE INSTRUCTIONS

Introduction

This service manual contains the functional checks, troubleshooting, adjustment, and part replacement instructions for COATS® Models 950, 950 Pro Racer, 1025,1050 and 1055 Wheel Balancers. Exploded views, illustrations, and an indexed parts list facilitate parts location, ordering, and replacement. All adjustments and replacements can be rendered with mechanic's or electrician's tools.

Safety Notes

High voltages, high torque motors, and high speed rotating wheels are present in coats wheel balancers. Follow the safety rules below while servicing a balancer:

1. Disconnect balancer from power source before starting any part replacement or internal adjustment.

2. Lower guard hood before starting cycle.

3. Do not wear neckties or loose clothing while servicing the balancer.

4. Be aware of hair length. If hair is long, wear it up under a hat.

5. Mounting cones must be centered in wheel before tightening. The wheel must be forced up firmly against the faceplate. The hub nut must be engaged by a minimum of four (4) full threads. Tighten hub nut by rotating the wheel and striking a spoke of the hub nut with the heel of the hand. Failure to tighten the hub nut could result in serious injury.

Servicing

Service should be performed only by COATS® trained and authorized service personnel. The troubleshooting and service procedures in this manual are arranged to allow rapid and thorough service. The steps are preliminary inspection, functional checks, repair of failure, replacement or adjustment, and functional checks. Identification of replacement parts required can be accomplished by using the pictorial breakdown and index in this manual. It is important that the functional checks be performed in sequence and the problem isolated prior to attempting any adjustments or replacements. If an adjustment or replacement is made, the entire functional checks must be performed successfully before the balancer can be considered available for service.

Equipment Needed

1. AC - DC / Volt - Ohm meter.

2. Test Wheel - Domestic 14, 15 or 16-inch diameter x 6 - 6 1/2-inch wide steel wheel with a center hole suitable for mounting with a back cone. A new 70 series tire properly mounted and inflated, balanced to within 0.05 ounces should be part of this wheel assembly. The lateral run out of this wheel should be less than 1/8".

3. Mechanic's and electrician's tools.

4. Thread locking anaerobic (Loctite 242 or equivalent).

5. Retaining compound (Loctite 601 or equivalent).

6. Dial indicator (runout gauge) with magnetic base, Starret No. 25-431 or equivalent.

7. Modeling Clay.

8. Motor Controller PCB tester (# 8112708)

9. *Membrane Touch Panel Tester (8112929)

Voltage & Phase Checking Procedure

1. Unplug the Balancer from the power source.

2. Perform all voltage checks shown in the appropriate diagram and chart at the power receptacle. If one or all voltage measurements is faulty be sure to check the status of the circuit breakers that supply the Balancer.

3. Check from one of the power terminals to the ground terminal to verify a ground is present. The voltage measurement should be approximately one half of the available voltage (i.e. 220V should read 110V). If the reading is less that one half the available voltage, there is not a ground present. Normal acceptable deviation is plus and minus 10%, damage can occur when voltage or amperage is beyond 10% design specs.

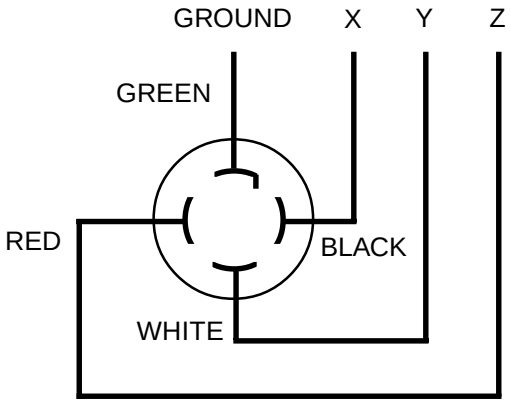
Note: If any faults are found in the above procedure, it is the responsibility of the owner. COATS authorized service personnel are not responsible for wiring within the building. Consult a licensed electrical contractor for proper installation to local electrical codes. Power outlets must be enclosed in a floor raceway or overhead drop if pedestrian or equipment traffic can damage power cord.

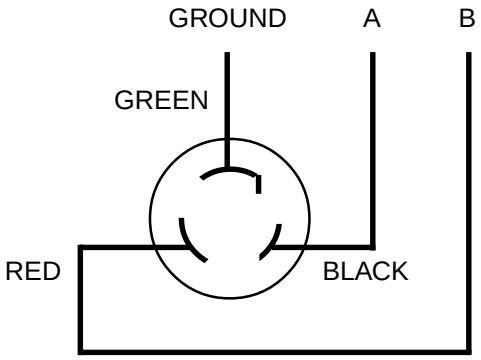
4. Plug the balancer to a power source.

5. Use an Ohmmeter to check the resistance between the frame of the Balancer and the building ground. The resistance should be less than 1 ohm. If the resistance measurement is greater that one (1) ohm, check the power plug and frame connection for proper contact.

⚠ CAUTION

Operation with a defective ground circuit will create a shock hazard for the operator and could damage the balancer's electronics. Operation with a defective ground circuit may void warranty.





THREE PHASE VOLTAGE REQUIREMENTS / INFORMATION

	208V/220V/230V	380V	460V
X - Y	195-250	370-420	420-480
X - Z	195-250	370-420	420-480
Y - Z	195-250	370-420	420-480
Plug Installed	Hubbell 2421		Hubbell 2431
Required Mating Outlet	Hubbell 2420 or Equivalent		Hubbell 2430 or Equivalent

SINGLE PHASE VOLTAGE REQUIREMENTS/ INFORMATION

	208V/220V/230V
A - B	195 - 250
Plug Installed	Hubbell 5466-C
Required Mating Outlet	Hubbell 5462 or Equivalent

Preliminary Inspection

1. Check the power supply to the balancer. See the procedure on page 6.

2. The Balancer should sit on all three (3) legs. Make sure the legs have not filled with dirt, wheel weights, or other foreign matter that may prevent a leg from making contact with the floor.

3. The floor should be a solid flat surface that does not allow the balancer legs to set into a recess in the floor or sink into the floor itself.

4. Check the operation of the cooling fan on the drive motor. The fan should run as soon as the balancer is powered. If the fan fails to run check the 1A breaker on the rear of the machine to see if it has tripped. If it has tripped, reset it. If it will not reset, see FAN MOTOR DOES NOT RUN.

5. Inspect cones, hub nut, pressure cup(s) , and threaded stud for damage. Missing cones or accessories should be replaced.

Functional Checks

Operational Check

1. Turn the power switch ON. The display should read as follows;

A, W, D	-	_0.0
Weight Display	-	_.00
Mode	-	Dynamic
Operator	-	A (Model 1050 only)
Grams/Ounces	-	Last Selection

If the display fails to light, see DISPLAY DOES NOT LIGHT.

2. Mount your test wheel (described in EQUIPMENT NEEDED. on the balancer.

3. Enter the wheel parameter data.

Note: If this is a Model 950 and the machine will not accept keypad entries, replace the keypad. If this does not correct the problem replace the PCB and put the original keypad back in.

Note: If this is a Model 1025,1050 or 1055 and you do not get proper wheel parameters from the A & D Arm, see A & D ARM PROBLEMS.

4. If the balancer is in round off mode, press and hold the SHIFT key and press ROUND OFF to enter the non-round off mode.

5. If the balancer is in gram mode, press and hold the SHIFT key and press GM/OZ key combination to set the balancer to read in ounces.

6. Install a 4 oz. weight on the outer rim of the test wheel.

7. Choose the DYNAMIC balancing mode.

8. Lower the guard hood.

9. Push the START button. The machine should now cycle. If the machine does not cycle, see BALANCER DOES NOT CYCLE.

10. The balancer should come up to speed, coast for several revolutions, and then brake to a stop. If the machine fails to brake and continues to coast, see BALANCER DOES NOT BRAKE.

11. The balancer should now have weight values and position lights displayed.

12. Position the wheel so the display for the center position LED for the outside (right) plane is flashing.

13. Note the position of the 4 oz. weight and the weight readings for both planes.

14. Perform five (5) spin cycles and note the positions and weight readings after each spin cycle. The weight readings should repeat within .2 oz and the position within ± 1/2 inch. If they do not, see REPEATABILITY PROBLEMS.

Note: If the customer had problems with a specific wheel assembly only, make sure there is no water or debris inside the tire.

Accuracy Check (Plane Separation)

1. Remove the 4 oz. weight from the wheel.

2. Fine balance the test wheel to obtain 0.00 (+0.02) weight readings on both displays. It may be necessary to use modeling clay to counter balance small imbalances.

3. Place a 4 oz. weight on the outside of the wheel.

4. Press start. The readings for this cycle should be as follows:

Inner (Left) Plane	=	0.00 + 0.20 oz.
Outer (Right) Plane	=	4.00 + 0.10 oz.
Outer Position flashing	=	4oz. at bottom-dead-center ± 1/2 inch

5. Move the 4 oz. weight to the inside plane. Press start. The reading should be as follows;

Inner (Left) Plane	=	4.00 ± 0.10 oz.
Outer (Right) Plane	=	0.00 ± 0.20 oz.
Inner Position flashing	=	4oz. at bottom-dead-center ± 1/2 inch

6. If the above results are not achieved check the A, W, and D dimensions and perform the A & D ARM CALIBRATION and the WEIGHT SENSOR CALIBRATION.

7. Check the placement of the distance tape, see the DISTANCE GAUGE TAPE PLACEMENT PROCEDURE.

8. If specified results are not achieved see ACCURACY PROBLEMS.

Rotational Check (Use a Hub Centric Wheel)

1. Remove the 4oz. weight from the inner rim and perform a fine balance to obtain 0.00 (+.02) weight readings on inner and outer plane.

2. Position valve stem at 6 o'clock. Loosen hub nut just enough to allow the wheel to move. While holding the faceplate so it cannot turn, rotate the wheel 90 degrees relative to the faceplate. Tighten hub nut.

3. Press START. Weight readings should be 0.30 oz. or less.

4. Repeat steps 2 & 3. At 180 and 270 degrees weight readings should be .30 oz. or less.

5. If the specified results are not achieved see ROTATIONAL PROBLEMS.

Calibration Procedures

Weight Sensor Calibration

1. Turn the power switch ON.

2. Mount the test wheel to the machine.

3. Enter the wheel parameters.

4. If the machine is in ROUND OFF mode, toggle it OFF by pressing and holding the SHIFT key and pressing ROUND OFF.

5. If the machine is not in ounce mode put it into ounce mode by pressing and holding the SHIFT key and pressing GM/OZ.

6. Press and hold the SHIFT key and press CALIBRATE to enter the calibration mode. The display should read CAL 0.

7. Push the START button. The machine should now cycle. This cycle is referred to as the zero spin cycle.

8. The balancer should come up to speed, coast for several revolutions, and then brake to a stop.

9. The display should now read CAL 4.

10. Position the wheel so the display for the center position LED for the outside (right) plane is flashing.

11. Add a 4 ounce weight to the 12 o'clock position on the outside (right) of the wheel.

12. Push the START button.

13. The outer (right) weight display should read 4.00 ± 0.02 oz. and the center position L.E.D. for the outside (right) plane should be flashing when the weight is at bottom dead center.

A & D Arm Calibration (Code 10)

1. Press and hold the SHIFT key and press 0. Then press 1 followed by 0. The A pot reading is displayed on the left weight display and the D pot reading is displayed in the right weight display. The reading for the A pot should be between 0.05 and 0.30 and the D reading should be between 0.40 and 0.80 when the arm is in the park position. If the readings are not between the given values see A and/or D PULLEY INSTALLATION.

2. Rotate the arm to the maximum diameter position. While holding the arm in this position, press the MODE key.

3. Return the arm to the park position and press the MODE key.

4. Pull the arm out to the test wheel and position it into the radius of the wheel. While holding the arm against the wheel you must enter the "distance" (A dimension) to the test wheel (enter as 2 digits i.e. 5.8). Before releasing the arm from this position, enter the diameter of the wheel (D dimension as 3 digits i. e.

14.0). After these parameters have been entered, the weight displays will show 0 and the machine returns to normal operating mode.

5. Return the arm to the park position. Then pull the arm out and position into the radius of the wheel. The correct A and D readings should appear on the wheel parameter display. These values would be within ± 0.20 of the values entered in calibration. If the readings are not within tolerance, check for slippage of the pot pulleys. If they are tight, see A & D ARM PROBLEMS.

Stop-On-Top Calibration (Code 20/21)

1. If the test wheel is not mounted to the machine, mount it.

2. Press and hold the SHIFT key and press 0. Then press 2 followed by 0. This will toggle the machine into Stop on Top feature. The weight display should now read SOT ON. If the display now reads SOT OFF, repeat the key sequence shown above.

3. Add a 4 oz. weight to the outside of the test wheel.

4. Press the START button.

5. When the wheel stops press and hold the SHIFT key and press 0. Then press 2 followed by 1 to calibrate.

6. Repeat steps 4 and 5 until the wheel stops with the 4 oz. weight at approximately 6 o'clock.

*Distance Gauge Tape Placement (Optimize A)

If the ACCURACY CHECK fails, try entering an A dimension .1 higher than the one used originally. If the plane separation gets worse, try using an A dimension .1 lower than the one used originally. If the plane separation gets better, keep increasing or decreasing the A dimension until an acceptable value is achieved. Calibrate the machine and perform the ACCURACY CHECK. Repeat this procedure until the ACCURACY CHECK produces an acceptable result. Move the distance tape to the position to allow proper A dimension entry. Calibrate the balancer using the new A dimension.

Error Codes

The following is a list of error codes. When the balancer is cycled several operating parameters are checked. If one of these parameters is not within tolerance, the machine will generate one of the following error codes and use the weight reading LEDs to display the error code. An explanation of these codes and a troubleshooting procedure follows each code.

Err - Displayed when an entered parameter entered is not in the acceptable range or not entered.

Err Hod - Displayed when the hood switch is not closed (the hood is up, the hood switch is bad) when the machine cycle is started. Try closing the hood if the machine still gives this error. See WHEEL DOES NOT SPIN.

Err Hub - Displayed when the machine detects a no "load" condition on the motor at start up. If there is a wheel mounted on the arbor, check the mounting of the wheel to make sure it is not "slipping". See REPEATABILITY PROBLEMS.

Err Cal - Displayed when an error has occurred during the calibration process. It can be caused by not placing the calibration weight on the wheel for one or both spins, or a defective PCB. The code is generated by equal piezo outputs in consecutive spins.

Err 1 - Displayed when the wheel moves slowly when the start button is depressed. This can be caused by a defective motor, defective contactor, motor control board, or incorrect wiring of either of the previous. See WHEEL DOES NOT SPIN.

Err 2 - Similar to Err 1, this message is displayed when the time to reach measurement speed is too long. This can be caused by a defective motor, defective contactor, motor control board, or incorrect wiring of either. See WHEEL DOES NOT SPIN.

Err 3 - Displayed when no encoder pulse is detected after the start button is pressed (the motor did not spin). This can be caused by incorrect wiring to the encoder, contactor, motor control board, motor, PCB, or safety interlock switch, If the drive motor did not start see the troubleshooting procedure for WHEEL DOES NOT SPIN. If the drive motor does begin to spin. See OPTICAL ENCODER CHECKING PROCEDURE.

Err 4 - Displayed when the machine detects the wheel rotation in the reverse direction. This can be caused by incorrect encoder or motor phasing, motor control board or a bad PCB. See WHEEL DOES NOT STOP.

Err 5 - This message is displayed when the time to brake the wheel to a stop at the end of the cycle is too

long. This can be caused by a bad contactor, motor control board or a bad PCB. See WHEEL DOES NOT STOP.

Err 6 - Displayed when there is no power to the LEDs on the encoder. This can be caused by a defective encoder or PCB, or improper encoder wiring. See OPTICAL ENCODER CHECKING PROCEDURE.

Err 7 - Displayed when a time out occurs within the software. This can be caused by noise interference in the encoder circuit causing a signal sequencing error. Check for a defective ground circuit or line filter problem.

Note: The machine should be on a dedicated circuit.

Err 8 - Displayed when The most likely cause is noise interference. Check for a defective encoder cable, or defective PCB. Check for a defective ground circuit or line filter problem.

Note: The machine should be on a dedicated circuit.

Err 9 - This message is displayed when the speed of the wheel has decreased at too fast a rate. This could occur if the machine is extremely cold and a small wheels mounted on the shaft.

Err 10 - This message is displayed when a sequence error has occurred with the calibration of the A & D arm. See the A & D ARM CALIBRATION PROCEDURE.

Err 11 - This message is displayed when an unacceptable A dimension was entered during the A & D arm calibration process. See the A & D ARM CALIBRATION PROCEDURE.

Err 12 - This message is displayed when an unacceptable D dimension was entered during the A & D Arm calibration process. See the A & D ARM CALIBRATION PROCEDURE.

Err 13 - This message is displayed when the A pot is not adjusted properly. See REPAIR PROCEDURES FOR A & D ARM ASSEMBLY.

Err 14 - This message is displayed when the D pot is not adjusted properly. See REPAIR PROCEDURES FOR A & D ARM ASSEMBLY.

Err 15 - *Displayed when the motor has gone overspeed prior to breaking. This could be caused by a defective PCB, encoder, contactor or motor control board, or incorrect wiring of either of the previous.

*Function Codes

The following is a list of function codes with it's description. Codes are entered into the balancer by pressing and holding the SHIFT key and then pressing and releasing the zero (0) key. At this time CDE will appear in the left weight display. The two digit code is then entered and appears in the right weight display. There is a slight delay after the second digit is entered at which time the display blanks temporarily and the code is executed. There is approximately a 10 second window from the time CDE appears for the operator to enter the 2 digit code. If the code is not entered in this time, the code entry routine will automatically be terminated.

10 Calibrate the A & D arm.

20 Toggle stop-on-top ON or OFF.

21 Calibrate stop-on-top.

40 Displays the software revision on the weight display. The revision letter(s) is/are shown on the left display and the revision level is shown on the right weight display.

41 Indicates presence or absence of A & D arm and stop-on-top hardware as dictated by the electronics. If there is no jumper connected between pins 15 and 17 on the 18 pin connector in the harness, the left display will show AR to indicate an A & D arm is present. If there is a jumper between these pins, the left weight display will show NAR to indicate the absence of an A & D arm. An analogous method is used for the stop-on-top feature. If there is no jumper between pins 16 and 18, the right weight display will show SOT to indicate the presence of the stop-on-top hardware; otherwise the display will show NST. It should be noted that the presence or absence of the arm and stop-on-top is not detected directly so if the jumpers are improperly installed, incorrect information will be displayed.

42 ***Keyboard Test -*** After the code is entered all displays will be blank. When a key is pressed the number of the key or a description of the function is activated (MODE and SHIFT keys) is displayed on the wheel parameter display. To exit the test, press and hold the SHIFT key and press the zero (0) key.

43 ***Display Test -*** All display segments are turned on simultaneously including decimal points and individual LED's. The test may be terminated by pressing and holding the SHIFT key and then pressing and releasing the zero (0) key. If the test is not terminated manually it will terminated automatically.

44 ***Encoder TEST -*** The encoder count is displayed on the right weight display and the left display is blanked. The count should be zero (0) when the top-dead-center

indicators are flashing. As the shaft is rotated forward, the count should increase. At the point where the bottom-dead-center indicators are flashing, the count should be 128 and should continue to increase as the shaft is rotated in the forward direction. The maximum count should be 255 which occurs just before the top-dead-indicator begin to flashing as the shaft is being rotated forward. If the shaft is being rotated in the reverse direction, the above comments apply to top-dead-center and bottom-dead-center. The count will decrease from 255 to zero (0) as the shaft is being rotated in the reverse direction from top-dead-center. The test may be terminated by pressing and holding the SHIFT key and then pressing and releasing the zero (0) key.

47 ***Cycle Count -*** This code displays the cycle count of the board. The cycle count is displayed in the weight display. The weight displays are treated as a single 6 digit display when displaying the count.

50 ***Exit Code -*** Code to escape from continues loop such as when displaying the transducer outputs.

51 ***A & D Arm Adjustment -*** This code represents a subset of code 10 (A & D arm calibration). It allow the A & D potentiometers to be continuously monitored with out having to do a complete calibration. The primary purpose is to enable the pulleys to be adjusted on the potentiometer shaft. The A potentiometer voltage is displayed on the left weight display and the D potentiometer voltage is displayed on the right weight display. To exit this code, enter code 50.

52 ***Piezo Output Test -*** 300 RPM. Used to verify that the output of the piezo are consistence through several spins. Refer to the checking procedure, piezo output.

53 ***Piezo Output Test -*** 200 RPM. Refer to the checking procedure, piezo output.

99 ***Counter Reset -*** This code resets the counter on the 950, 1025,1050, and 1055.

Troubleshooting Section for Models 950,1025,1050 & 1055 Balancers

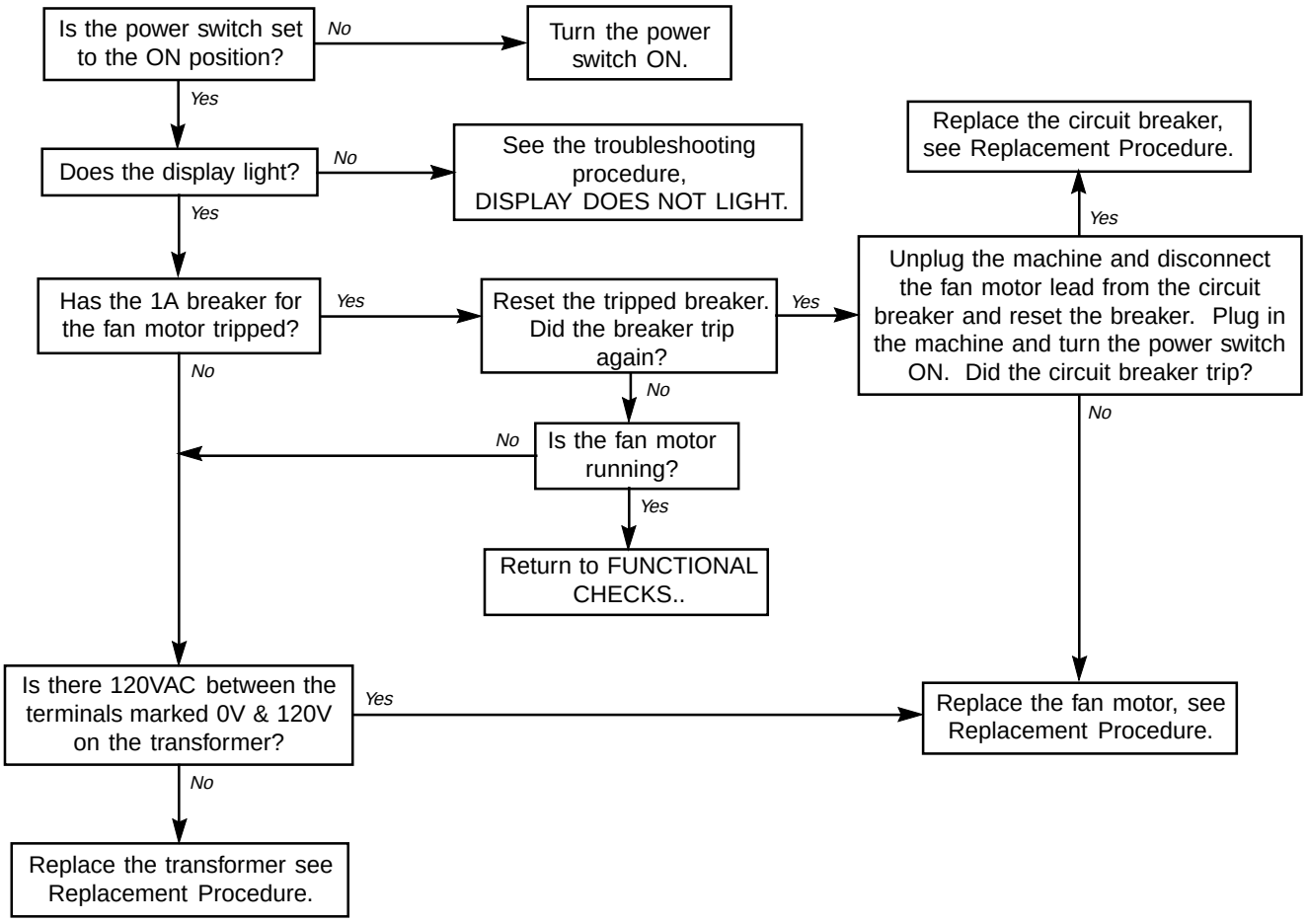
Introduction

For balancers with Solid State Motor Controllers refer to that section only in the flow charts and wiring diagrams located in the back of this manual. The troubleshooting section of this manual makes use of flow charts. These flow charts will enable you to more quickly and accurately locate the problem with the balancer. The main topics covered by these flow charts are FAN MOTOR DOES NOT RUN, ACCURACY PROBLEMS, ROTATIONAL PROBLEMS, REPEATABILITY PROBLEMS, DISPLAY DOES NOT LIGHT, BALANCER DOES NOT CYCLE, and BALANCER DOES NOT BRAKE. These flow charts may refer you to another section of the manual. If after a repair has been completed you encounter another or similar problem, refer to the section that best describes the problem currently encountered. The flow charts are designed to lead you to the most likely problems towards the top of the chart, where possible. Hennessy Industries, Inc. hopes this manual will help you provide the best and most thorough service to our customers.

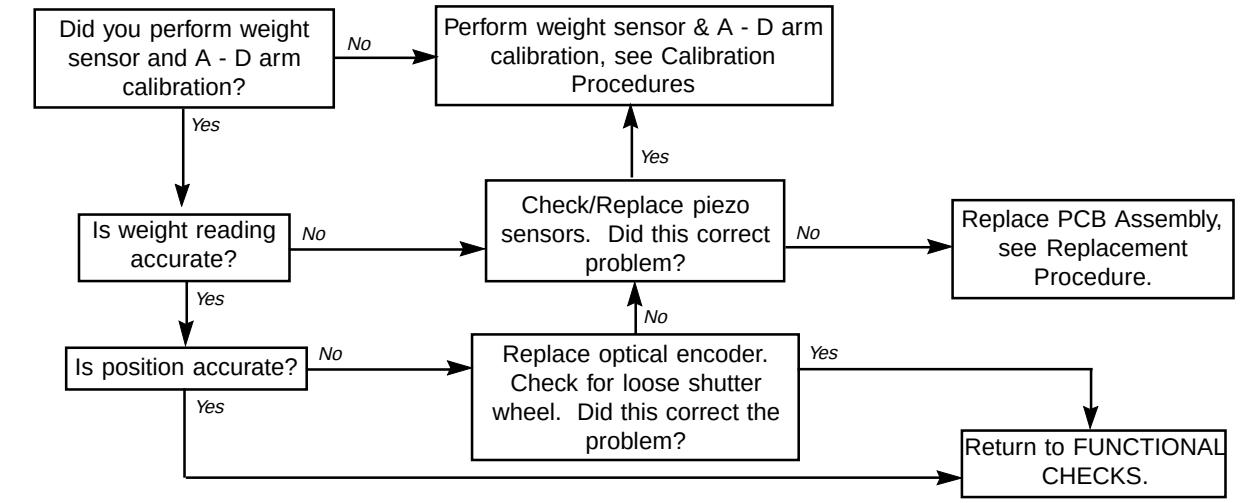
The flow charts will refer to several voltage checks at various points. To avoid lengthy and confusing charts, the voltages shown on the blocks of the chart are nominal. To better define these voltages see the range chart below:

120VAC	=	98 to 125VAC
220VAC	=	198 to 240VAC
27VDC	=	22 to 32VDC

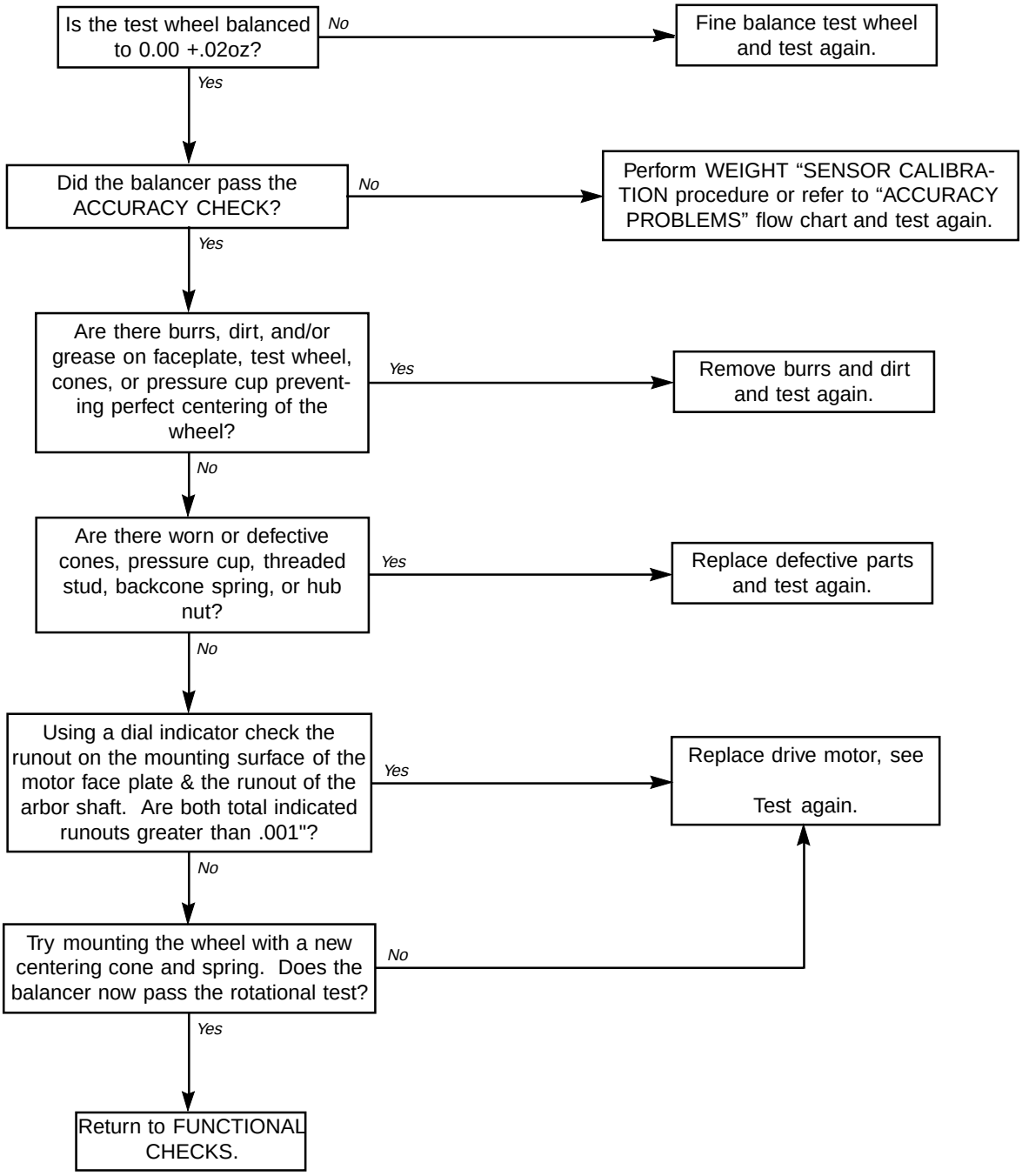
Fan Motor Does Not Run (Contactor Model)


Is the power switch set to the ON position?
No
Turn the power switch ON.
Yes
Does the display light?
No
See the troubleshooting procedure, DISPLAY DOES NOT LIGHT.
Yes
Has the 1A breaker for the fan motor tripped?
Yes
Reset the tripped breaker. Did the breaker trip again?
Yes
Unplug the machine and disconnect the fan motor lead from the circuit breaker and reset the breaker. Plug in the machine and turn the power switch ON. Did the circuit breaker trip?
Yes
Replace the circuit breaker, see Replacement Procedure.
No
Is the fan motor running?
No
Yes
Return to FUNCTIONAL CHECKS..
No
Is there 120VAC between the terminals marked 0V & 120V on the transformer?
Yes
Replace the fan motor, see Replacement Procedure.
No
Replace the transformer see Replacement Procedure.

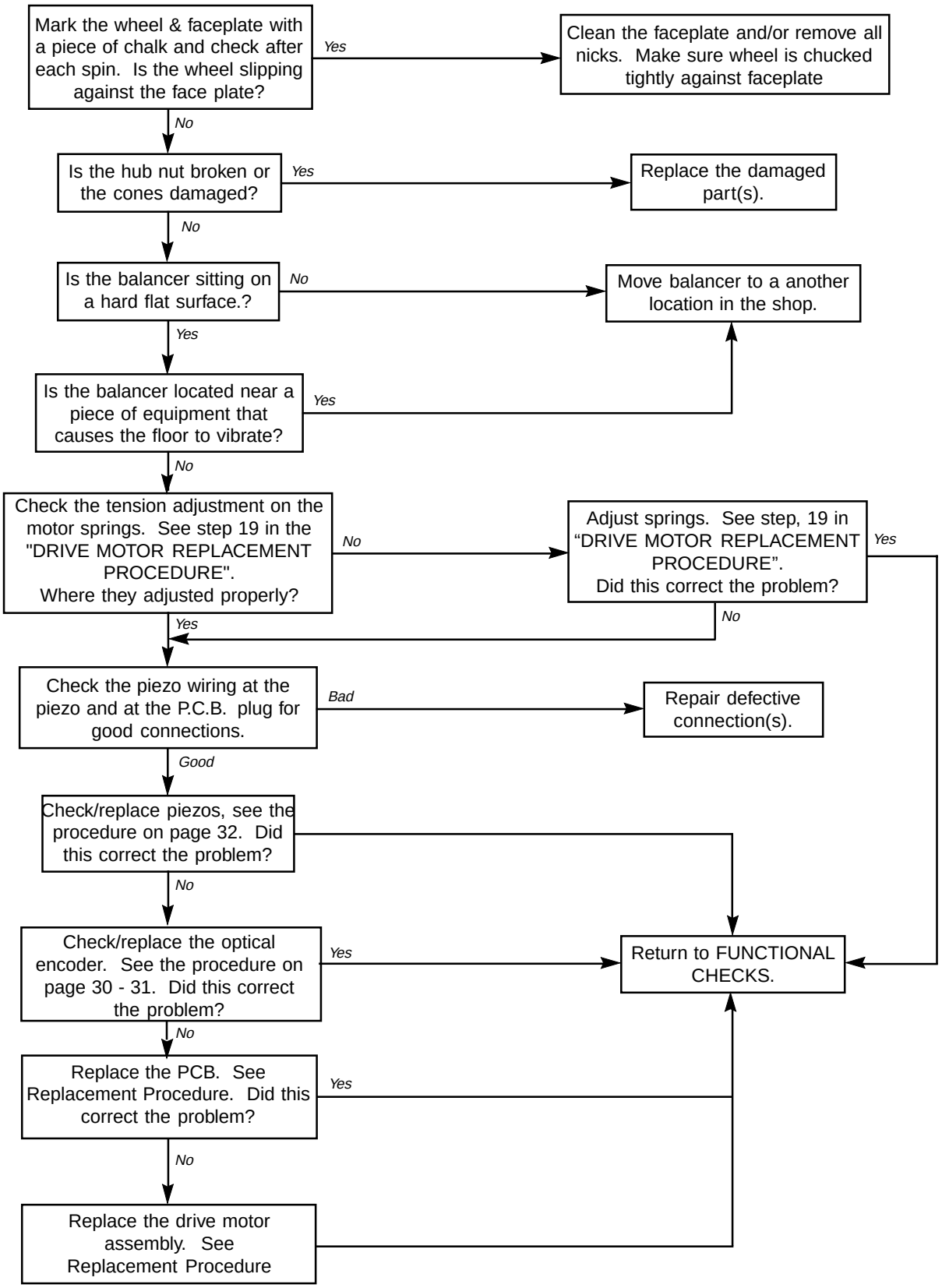
Accuracy Problems (Plane Separation)



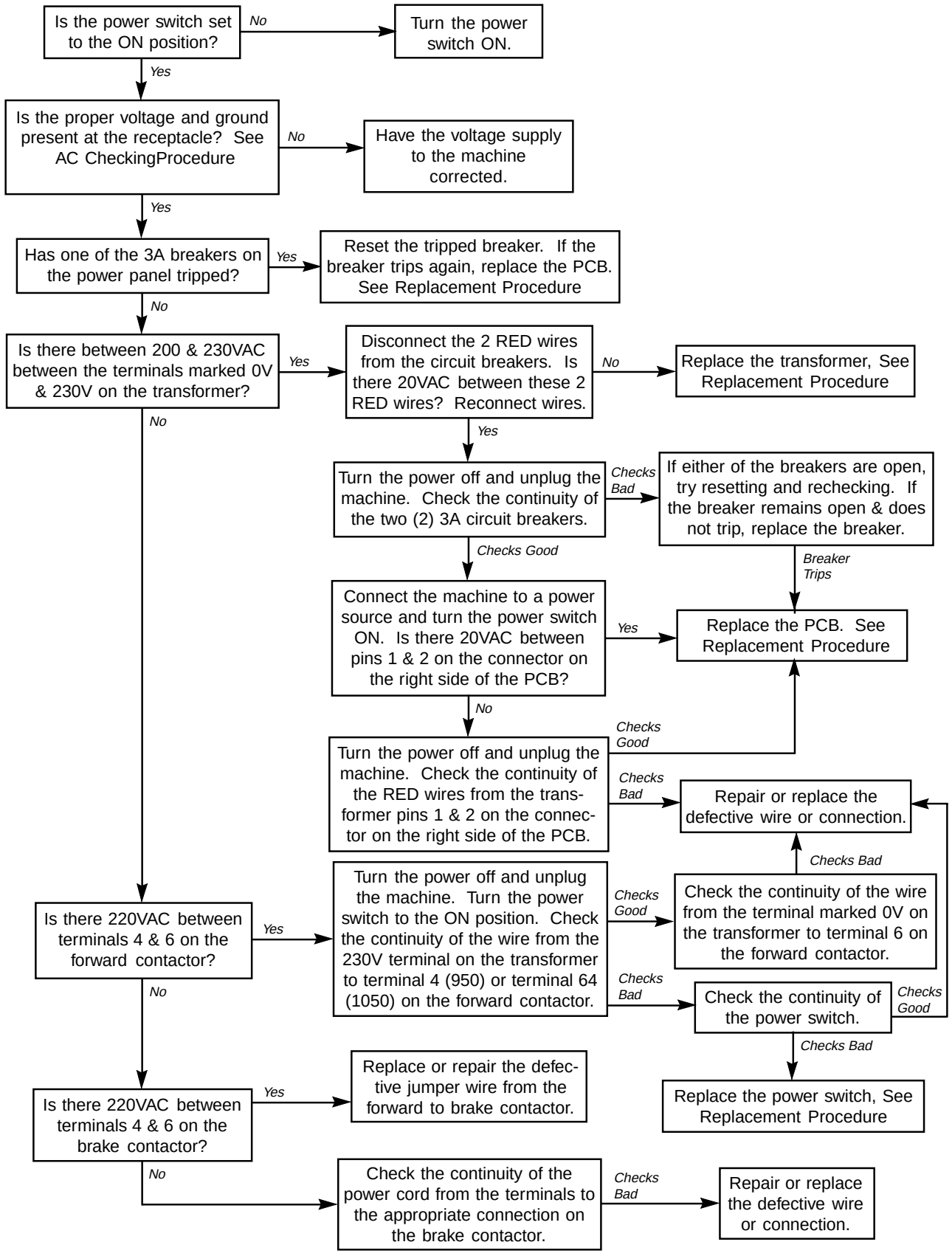
Rotational Problems (Contactor & Motor Controller Model)


Is the test wheel balanced to 0.00 +.02oz?
No
Fine balance test wheel and test again.
Yes
Did the balancer pass the ACCURACY CHECK?
No
Perform WEIGHT "SENSOR CALIBRATION procedure or refer to "ACCURACY PROBLEMS" flow chart and test again.
Yes
Are there burrs, dirt, and/or grease on faceplate, test wheel, cones, or pressure cup preventing perfect centering of the wheel?
Yes
Remove burrs and dirt and test again.
No
Are there worn or defective cones, pressure cup, threaded stud, backcone spring, or hub nut?
Yes
Replace defective parts and test again.
No
Using a dial indicator check the runout on the mounting surface of the motor face plate & the runout of the arbor shaft. Are both total indicated runouts greater than .001"?
Yes
Replace drive motor, see
Test again.
No
Try mounting the wheel with a new centering cone and spring. Does the balancer now pass the rotational test?
No
Yes
Return to FUNCTIONAL CHECKS.

Repeatability Problems (Contactor & Motor Controller Model)

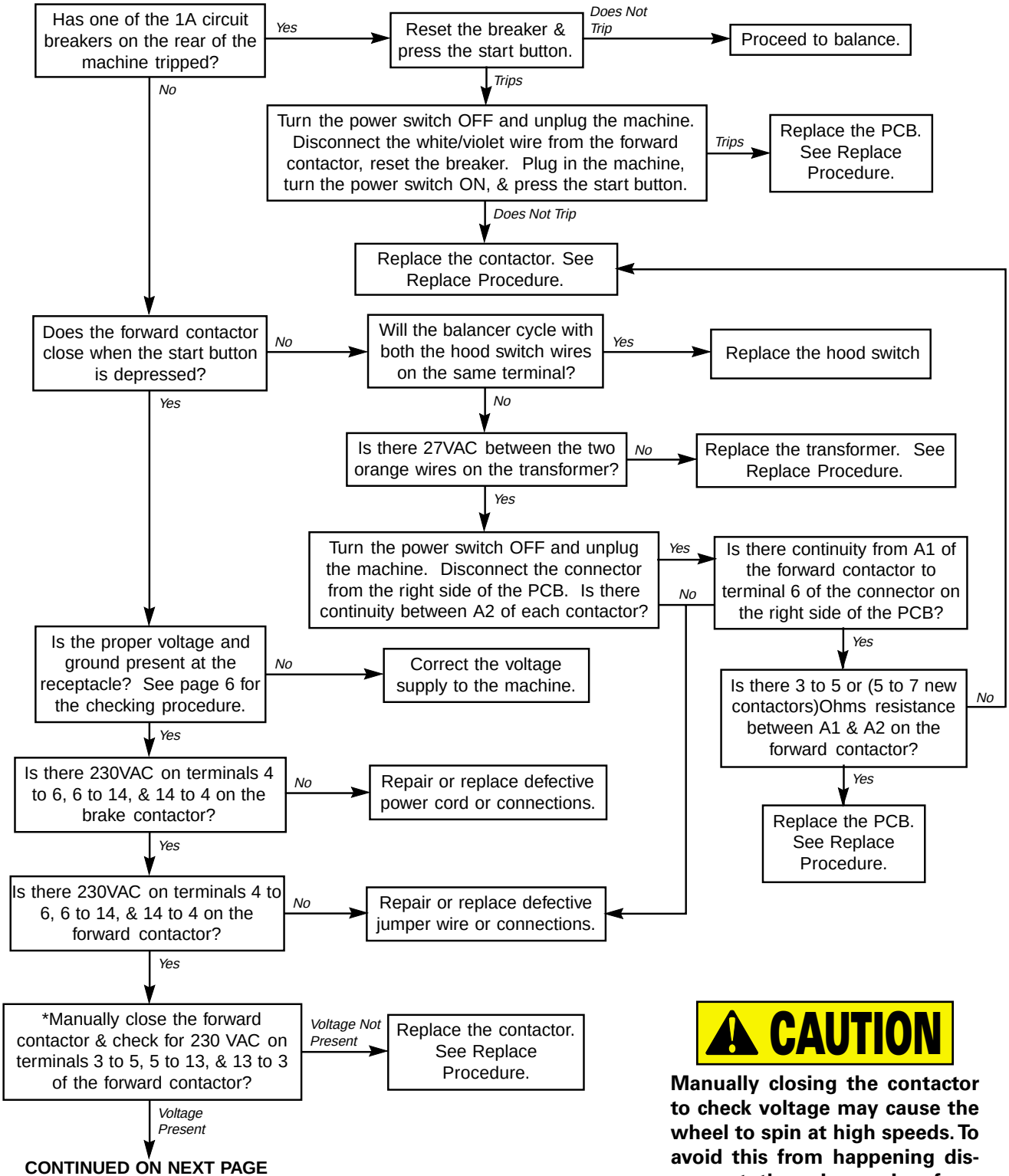

Mark the wheel & faceplate with a piece of chalk and check after each spin. Is the wheel slipping against the face plate?
Yes
Clean the faceplate and/or remove all nicks. Make sure wheel is chucked tightly against faceplate
No
Is the hub nut broken or the cones damaged?
Yes
Replace the damaged part(s).
No
Is the balancer sitting on a hard flat surface.?
No
Move balancer to a another location in the shop.
Yes
Is the balancer located near a piece of equipment that causes the floor to vibrate?
Yes
No
Check the tension adjustment on the motor springs. See step 19 in the "DRIVE MOTOR REPLACEMENT PROCEDURE". Where they adjusted properly?
No
Adjust springs. See step, 19 in "DRIVE MOTOR REPLACEMENT PROCEDURE". Did this correct the problem?
Yes
No
Yes
Check the piezo wiring at the piezo and at the P.C.B. plug for good connections.
Bad
Repair defective connection(s).
Good
Check/replace piezos, see the procedure on page 32. Did this correct the problem?
No
Check/replace the optical encoder. See the procedure on page 30 - 31. Did this correct the problem?
Yes
Return to FUNCTIONAL CHECKS.
No
Replace the PCB. See Replacement Procedure. Did this correct the problem?
Yes
No
Replace the drive motor assembly. See Replacement Procedure

Display Does Not Light (Contactor Model)


Is the power switch set to the ON position?
No
Turn the power switch ON.
Yes
Is the proper voltage and ground present at the receptacle? See AC CheckingProcedure
No
Have the voltage supply to the machine corrected.
Yes
Has one of the 3A breakers on the power panel tripped?
Yes
Reset the tripped breaker. If the breaker trips again, replace the PCB. See Replacement Procedure
No
Is there between 200 & 230VAC between the terminals marked 0V & 230V on the transformer?
Yes
Disconnect the 2 RED wires from the circuit breakers. Is there 20VAC between these 2 RED wires? Reconnect wires.
No
Replace the transformer, See Replacement Procedure
Yes
No
Turn the power off and unplug the machine. Check the continuity of the two (2) 3A circuit breakers.
Checks Bad
If either of the breakers are open, try resetting and rechecking. If the breaker remains open & does not trip, replace the breaker.
Checks Good
Breaker Trips
Connect the machine to a power source and turn the power switch ON. Is there 20VAC between pins 1 & 2 on the connector on the right side of the PCB?
Yes
Replace the PCB. See Replacement Procedure
No
Checks Good
Turn the power off and unplug the machine. Check the continuity of the RED wires from the transformer pins 1 & 2 on the connector on the right side of the PCB.
Checks Bad
Repair or replace the defective wire or connection.
Checks Bad
Is there 220VAC between terminals 4 & 6 on the forward contactor?
Yes
Turn the power off and unplug the machine. Turn the power switch to the ON position. Check the continuity of the wire from the 230V terminal on the transformer to terminal 4 (950) or terminal 64 (1050) on the forward contactor.
Checks Good
Check the continuity of the wire from the terminal marked 0V on the transformer to terminal 6 on the forward contactor.
No
Checks Bad
Check the continuity of the power switch.
Checks Good
Checks Bad
Replace the power switch, See Replacement Procedure
Is there 220VAC between terminals 4 & 6 on the brake contactor?
Yes
Replace or repair the defective jumper wire from the forward to brake contactor.
No
Check the continuity of the power cord from the terminals to the appropriate connection on the brake contactor.
Checks Bad
Repair or replace the defective wire or connection.

Balancer Does Not Cycle (Contactor Model)

To use the following chart you will need a tire and wheel assembly mounted on the balancer, the hood closed, and the proper A, W, and D dimensions entered. If you are unable to manually enter the proper wheel dimensions, replace the touch panel.

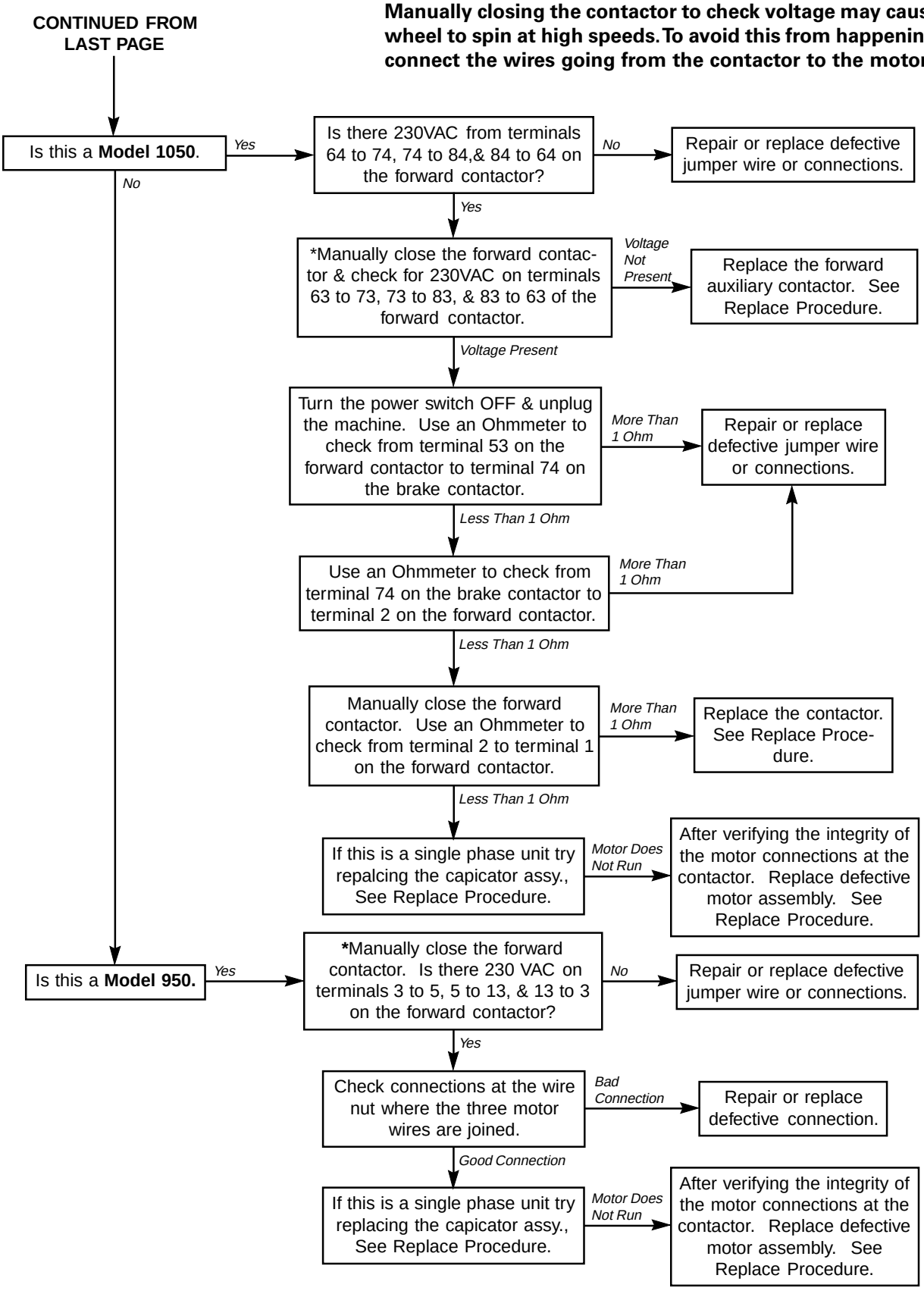

Has one of the 1A circuit breakers on the rear of the machine tripped?
Yes
Reset the breaker & press the start button.
Does Not Trip
Proceed to balance.
Trips
No
Turn the power switch OFF and unplug the machine. Disconnect the white/violet wire from the forward contactor, reset the breaker. Plug in the machine, turn the power switch ON, & press the start button.
Trips
Replace the PCB. See Replace Procedure.
Does Not Trip
Replace the contactor. See Replace Procedure.
Does the forward contactor close when the start button is depressed?
No
Will the balancer cycle with both the hood switch wires on the same terminal?
Yes
Replace the hood switch
Yes
No
Is there 27VAC between the two orange wires on the transformer?
No
Replace the transformer. See Replace Procedure.
Yes
Turn the power switch OFF and unplug the machine. Disconnect the connector from the right side of the PCB. Is there continuity between A2 of each contactor?
Yes
Is there continuity from A1 of the forward contactor to terminal 6 of the connector on the right side of the PCB?
No
Yes
Is the proper voltage and ground present at the receptacle? See page 6 for the checking procedure.
No
Correct the voltage supply to the machine.
Is there 3 to 5 or (5 to 7 new contactors)Ohms resistance between A1 & A2 on the forward contactor?
No
Yes
Yes
Is there 230VAC on terminals 4 to 6, 6 to 14, & 14 to 4 on the brake contactor?
No
Repair or replace defective power cord or connections.
Replace the PCB. See Replace Procedure.
Yes
Is there 230VAC on terminals 4 to 6, 6 to 14, & 14 to 4 on the forward contactor?
No
Repair or replace defective jumper wire or connections.
Yes
*Manually close the forward contactor & check for 230 VAC on terminals 3 to 5, 5 to 13, & 13 to 3 of the forward contactor?
Voltage Not Present
Replace the contactor. See Replace Procedure.
Voltage Present
CONTINUED ON NEXT PAGE

CAUTION

Manually closing the contactor to check voltage may cause the wheel to spin at high speeds. To avoid this from happening disconnect the wires going from the contactor to the motor.

CAUTION

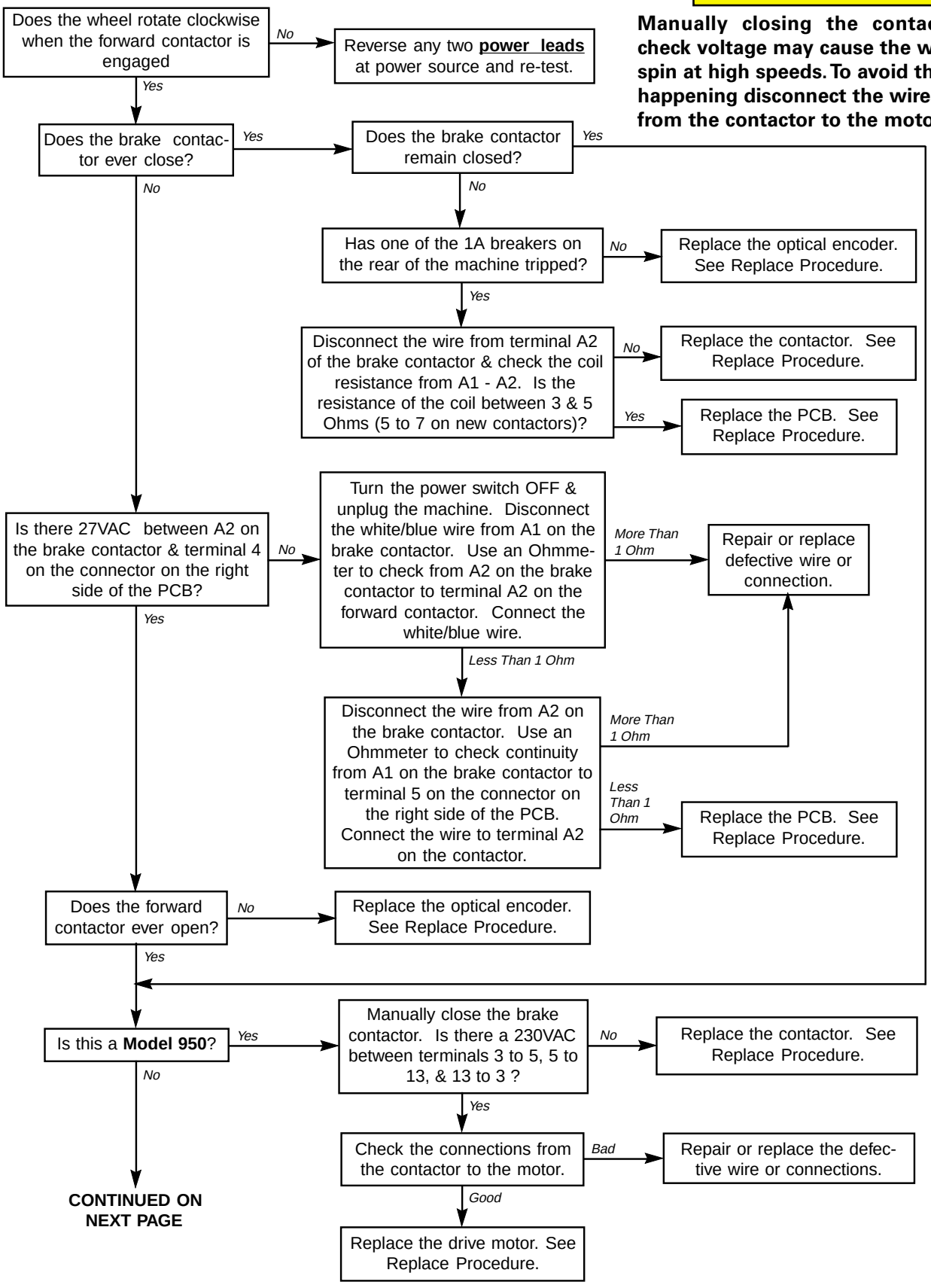
Manually closing the contactor to check voltage may cause the wheel to spin at high speeds. To avoid this from happening disconnect the wires going from the contactor to the motor.


CONTINUED FROM LAST PAGE
Is this a **Model 1050**.
Yes
Is there 230VAC from terminals 64 to 74, 74 to 84,& 84 to 64 on the forward contactor?
No
Repair or replace defective jumper wire or connections.
Yes
*Manually close the forward contactor & check for 230VAC on terminals 63 to 73, 73 to 83, & 83 to 63 of the forward contactor.
Voltage Not Present
Replace the forward auxiliary contactor. See Replace Procedure.
Voltage Present
Turn the power switch OFF & unplug the machine. Use an Ohmmeter to check from terminal 53 on the forward contactor to terminal 74 on the brake contactor.
More Than 1 Ohm
Repair or replace defective jumper wire or connections.
Less Than 1 Ohm
Use an Ohmmeter to check from terminal 74 on the brake contactor to terminal 2 on the forward contactor.
More Than 1 Ohm
Less Than 1 Ohm
Manually close the forward contactor. Use an Ohmmeter to check from terminal 2 to terminal 1 on the forward contactor.
More Than 1 Ohm
Replace the contactor. See Replace Procedure.
Less Than 1 Ohm
If this is a single phase unit try repalcing the capicator assy., See Replace Procedure.
Motor Does Not Run
After verifying the integrity of the motor connections at the contactor. Replace defective motor assembly. See Replace Procedure.
No
Is this a **Model 950.**
Yes
*Manually close the forward contactor. Is there 230 VAC on terminals 3 to 5, 5 to 13, & 13 to 3 on the forward contactor?
No
Repair or replace defective jumper wire or connections.
Yes
Check connections at the wire nut where the three motor wires are joined.
Bad Connection
Repair or replace defective connection.
Good Connection
If this is a single phase unit try replacing the capicator assy., See Replace Procedure.
Motor Does Not Run
After verifying the integrity of the motor connections at the contactor. Replace defective motor assembly. See Replace Procedure.

Balancer Does Not Brake (Contactor Model)

CAUTION

Manually closing the contactor to check voltage may cause the wheel to spin at high speeds. To avoid this from happening disconnect the wires going from the contactor to the motor.


Does the wheel rotate clockwise when the forward contactor is engaged
No
Reverse any two power leads at power source and re-test.
Yes
Does the brake contactor ever close?
Yes
Does the brake contactor remain closed?
Yes
No
No
Has one of the 1A breakers on the rear of the machine tripped?
No
Replace the optical encoder. See Replace Procedure.
Yes
Disconnect the wire from terminal A2 of the brake contactor & check the coil resistance from A1 - A2. Is the resistance of the coil between 3 & 5 Ohms (5 to 7 on new contactors)?
No
Replace the contactor. See Replace Procedure.
Yes
Replace the PCB. See Replace Procedure.
Is there 27VAC between A2 on the brake contactor & terminal 4 on the connector on the right side of the PCB?
No
Turn the power switch OFF & unplug the machine. Disconnect the white/blue wire from A1 on the brake contactor. Use an Ohmmeter to check from A2 on the brake contactor to terminal A2 on the forward contactor. Connect the white/blue wire.
More Than 1 Ohm
Repair or replace defective wire or connection.
Yes
Less Than 1 Ohm
Disconnect the wire from A2 on the brake contactor. Use an Ohmmeter to check continuity from A1 on the brake contactor to terminal 5 on the connector on the right side of the PCB. Connect the wire to terminal A2 on the contactor.
More Than 1 Ohm
Less Than 1 Ohm
Replace the PCB. See Replace Procedure.
Does the forward contactor ever open?
No
Replace the optical encoder. See Replace Procedure.
Yes
Is this a Model 950?
Yes
Manually close the brake contactor. Is there a 230VAC between terminals 3 to 5, 5 to 13, & 13 to 3 ?
No
Replace the contactor. See Replace Procedure.
No
Yes
Check the connections from the contactor to the motor.
Bad
Repair or replace the defective wire or connections.
Good
Replace the drive motor. See Replace Procedure.
CONTINUED ON NEXT PAGE

CAUTION

Manually closing the contactor to check voltage may cause the wheel to spin at high speeds. To avoid this from happening disconnect the wires going from the contactor to the motor.

CONTINUED FROM LAST PAGE

Does the Balancer trip a circuit breaker on the electrical panel when it starts the brake cycle?

Yes → Check the bridge rectifiers. See Checking Procedure.

No

Manually close the brake contactor. Is there 220VDC on between terminals 13 & 54 on the forward contactor?

No → Manually close the brake contactor. Is there 220VAC between terminals 3 & 5 on the lower contactor?

No → Replace the contactor. See Replace Procedure.

Yes

Yes

Turn the power switch OFF and unplug the balancer from the power source. Manually close the brake contactor. Use an Ohmmeter to check between terminals 53 & 54 and between terminals 83 and 84 on the brake contactor. Is there less than 1 Ohm on both checks?

No → Replace the auxiliary brake contactor. See Replacement Procedure.

Yes

Turn the power switch OFF. Manually close the brake contactor. Use an Ohmmeter to check these connections for continuity on the brake contactor, 63 to 64 & 73 to 74. If your meter fails to read 0.0 ohms, replace the auxiliary (piggy back) contactor on the brake contactor. While the contactor is closed also check terminals 1 to 2 on the brake contactor. If your meter fails to register any resistance, replace the primary contactor.

Use an Ohmmeter to check the following connections. If your meter fails to register 0.0 ohms, repair or replace the defective wire or connection(s) associated with the terminals just checked.

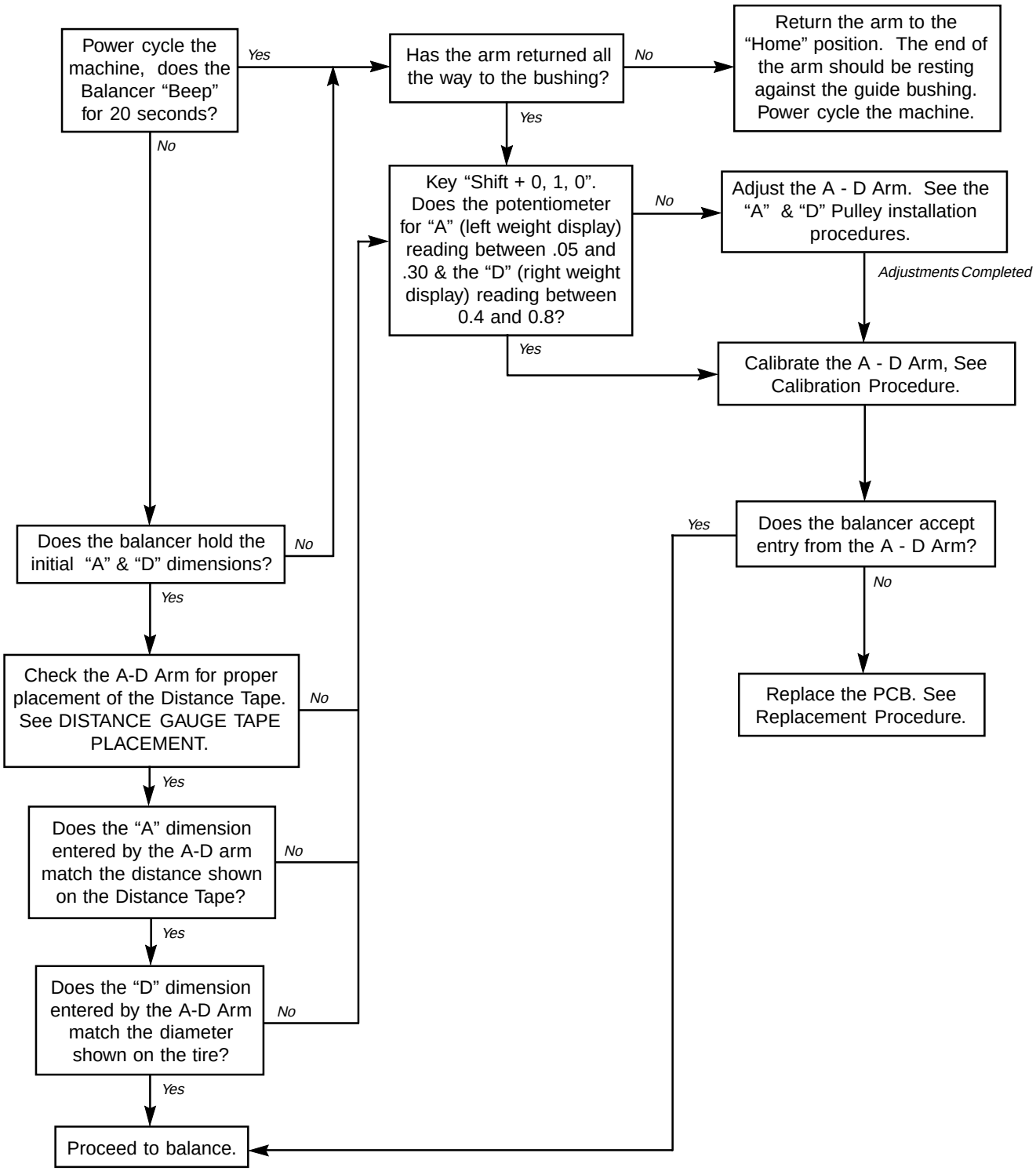
Forward contactor terminal 1 to brake contactor terminal 2.
Forward contactor terminal 5 to brake contactor terminal 1.
Forward contactor terminal 3 to brake contactor terminal 63.
Forward contactor terminal 73 to brake contactor terminal 64.
Forward contactor terminal 53 to brake contactor terminal 74.
Forward contactor terminal 83 to brake contactor terminal 73.

After verifying the integrity of the motor connections to the contactor, replace the motor assembly. See Replacement Procedure.

Use an Ohmmeter to check for continuity on the following connections. If your meter fails to register any resistance, repair or replace the defective wire or connection(s) associated with the terminals just checked.

Forward contactor terminal 13 to brake contactor terminal 84.
Forward contactor terminal 54 to brake contactor terminal 54.
Brake contactor terminal 83 to both rectifiers terminal “+”.
Brake contactor terminal 53 to both rectifiers terminal “-”.
Brake contactor terminal 5 to all 4 rectifier terminals “~”.
(Only one terminal on each contactor will give a reading.)
Brake contactor terminal 13 to 2 rectifier terminals “~” that did not render a reading in the previous check.

A & D Arm Problems

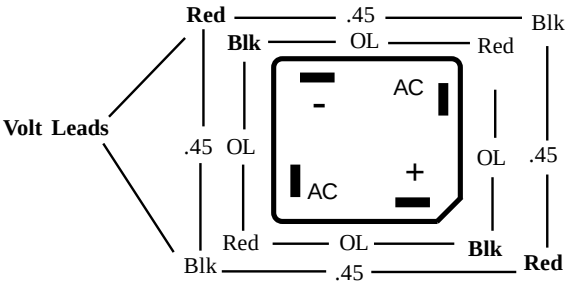

Power cycle the machine, does the Balancer "Beep" for 20 seconds?
Yes
No
Has the arm returned all the way to the bushing?
No
Return the arm to the "Home" position. The end of the arm should be resting against the guide bushing. Power cycle the machine.
Yes
Key "Shift + 0, 1, 0". Does the potentiometer for "A" (left weight display) reading between .05 and .30 & the "D" (right weight display) reading between 0.4 and 0.8?
No
Adjust the A - D Arm. See the "A" & "D" Pulley installation procedures.
Adjustments Completed
Yes
Calibrate the A - D Arm, See Calibration Procedure.
Does the balancer accept entry from the A - D Arm?
Yes
No
Replace the PCB. See Replacement Procedure.
Does the balancer hold the initial "A" & "D" dimensions?
No
Yes
Check the A-D Arm for proper placement of the Distance Tape. See DISTANCE GAUGE TAPE PLACEMENT.
No
Yes
Does the "A" dimension entered by the A-D arm match the distance shown on the Distance Tape?
No
Yes
Does the "D" dimension entered by the A-D Arm match the diameter shown on the tire?
No
Yes
Proceed to balance.

Checking Procedures

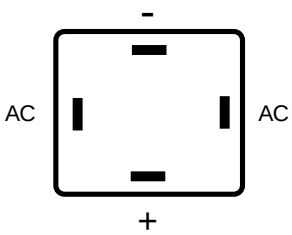
*Bridge Rectifiers

1. Turn the power switch OFF and unplug the machine.

2. There are several type of rectifiers with different types of terminal identification. Use the drawing below that best represents the type oof rectifier you are checking



Typical readings, your VOM readings may very slightly.



3. Remove all wires from the rectifier being checked.

4. Set Ohmmeter to the diode check mode, if so equipped. If your meter does not have this mode, use the highest range ohm scale.

5. Plug the red lead into the meter in the connection marked ohms.

6. Plug the black lead into the meter connection marked common or ground.

7. Place the black lead of your meter on the terminal marked (+).

8. Use the red lead of your meter to check to the other two (2) AC terminals.

9. The readings from these terminals should not represent a short (0.00). If at any time during this procedure you obtain a reading that represents a short, the rectifier must be replaced.

10. Place the red lead of your meter on the terminal marked (-).

11. Use the black lead of your meter to check to the other two (2) AC terminals.

*Optical Encoder (Code 44)

1. Press and hold the SHIFT key and press 0. Then press 4 followed by 4. Rotate the wheel, the readings in the display window should change from 000 to 255. If not check the shutter disc for blockage then check the following voltages.

2. When reading the voltages on the white & green wires, turn the faceplate slowly by hand. The low voltage must be less than .7VDC. The high voltages must be greater than 4.0VDC.

3. Voltage readings are taken with all optical encoder wires connected.

Lead Color	Voltage
Green to Violet (GND) -	2.4 ± .5VDC
Yellow to Violet -	Less than .7VDC; greater than 4VDC
Blue to Violet -	Less than .7VDC; greater than 4VDC

*Motor Circuit Testing

The following diagram will be useful when troubleshooting the motor circuit of a 1004, 1050, or 6401 balancer (contactor style).

It allows you to troubleshoot just the motor using the motor wiring diagram or the complete circuit using the Forward or Braking diagrams. The readings may vary slightly depending on your ohm meter but the three readings should be consistently the same.

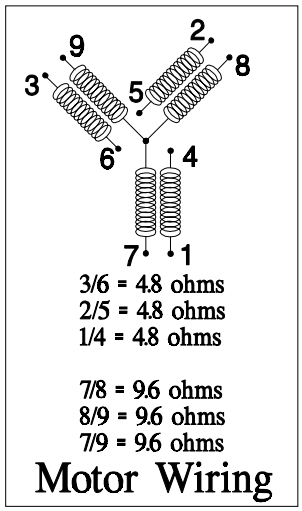
It may be useful to check the readings on a working balancer so you will know what your meter reads before trying to repair a nonworking balancer.

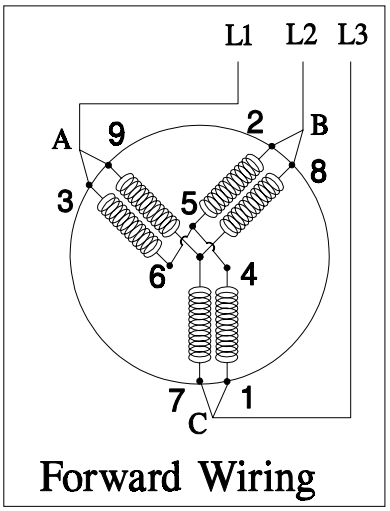
Solid State Balancer motors may be checked in a similar manner by unplugging the motor connector and reading across the three motor wires, you should have the same readings across L1 to L2, L2 to L3, L1 to L3.

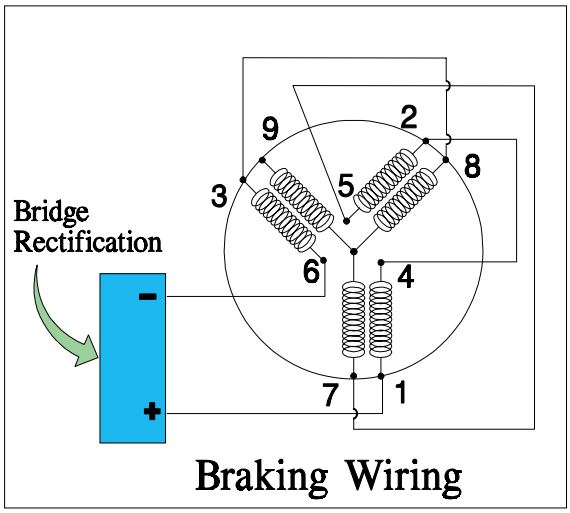
⚠ CAUTION

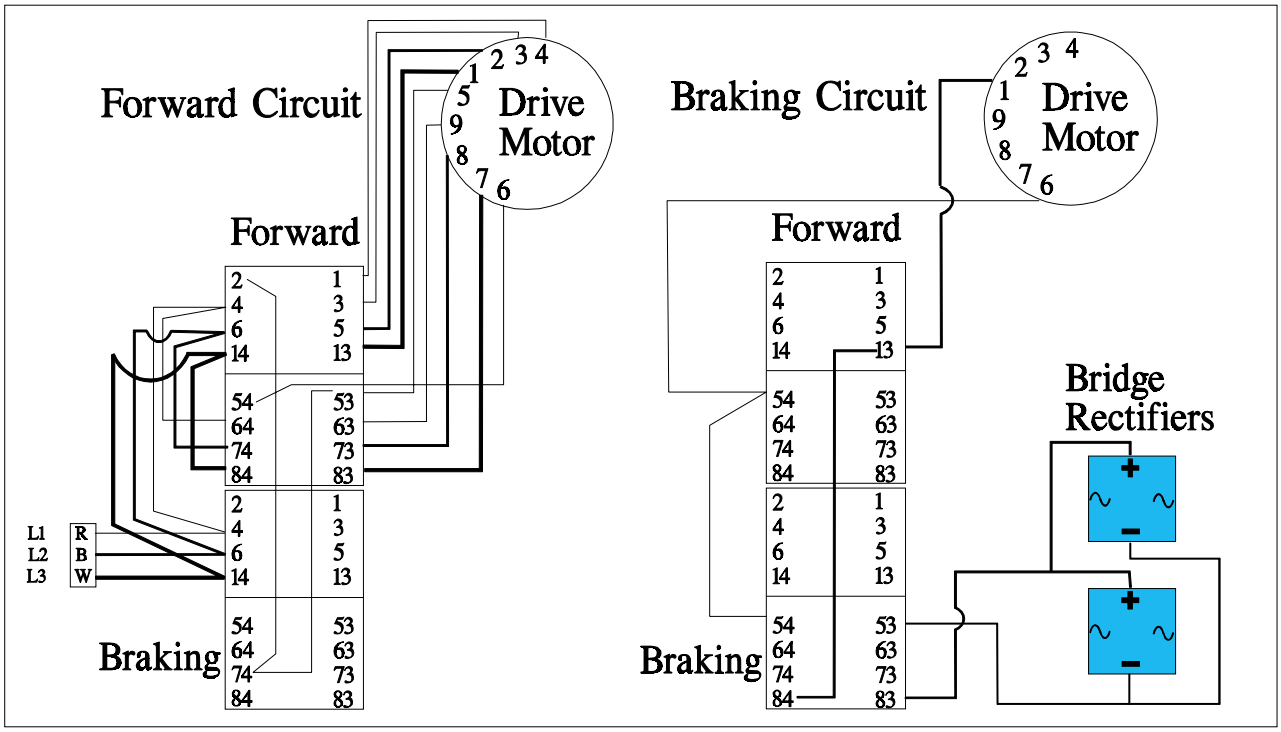
Remember to unplug the balancer before using this procedure.

***Motor Circuit Diagram**









WARNING

Disconnect AC power before taking readings.

The motor may be checked individually using the motor wiring diagram above. The complete spin circuit may be checked by placing your ohm leads across L1&L2, L2&L3, L1&L3. Press and hold the spin contactor in while taking the reading. The readings should be approximately the same (4.8 ohms + or - 1 ohm). If one leg reads different than the other two, use the Forward Circuit diagram and check for a bad connection, bad wire crimp, or high resistance through the contactor or motor winding.

To check the braking circuit, disconnect the rectifier from the 83. Place your ohms leads across 53 and 83. Press and hold the brake contactor and check the reading. It should be approximately 24 ohms (5 x 4.8). If the reading is incorrect use the Brake Circuit diagram to check for a bad connection, bad wire crimp, or high resistance through the contactor or motor winding.

*Piezo Output

The piezo out-put test can be used to help diagnose problems or failures with piezos on the 950/1050, 1025 (Limited Edition), 850, and 700 balancers. When the test is activated the weight display will show four different readings as the Dynamic, RV, Alloy 1, and Alloy 2 LED's alternately light up. The values needed are the Dynamic (1st LED) and Alloy 1 (3rd LED). Dynamic value is the amplitude, or signal strength, of the left piezo. Alloy 1 is the amplitude of the right front and rear piezo added together (except for 850 that only has two piezos). It is the consistency of the readings through five or six spins that is important, not the value of the readings.

To use the codes perform the following steps:

1. Mount a balanced wheel on the balancer with a 4 oz. weight on the outside, enter the wheel parameters.

2. Enter the piezo test code for the model balancer being tested. Ignore the initial set of values displayed.

3. Spin the wheel by closing the wheel guard and/or pressing the spin button. When the balancer stops, write down the values when the Dynamic and Alloy 1 LED's are on. These values will be slightly different on each balancer. Typical readings for 950/1050 balancer

Left Display 1150 Right Display 1050

4. Repeat step 3 above for five more spins. Remember you are looking for consistency of the readings.

5. If the Dynamic value fluctuates more than +/- 10, check and/or replace the left piezo.

Note: The following steps will allow both right piezos to be tested individually by unpluging one at a time.

(The 850 only has two piezos and may be tested by reviewing the left and right readings.)

6. If the Alloy 1 reading fluctuates more than +/- 10 test the right front piezo by unplugging the right rear piezo and repeating step 4.

7. If the reading is stable the right front piezo is good. Check and/or replace the right rear piezo after testing.

8. If the reading in step #7 fluctuates, check and/or replace the right front piezo.

9. Reverse steps #6 and #7 to test the right rear piezo. Both piezos should be checked individually before replacing either piezo.

Note: Rust, corrosion, and trash under the piezo ball or between the piezo and the chassie can cause a bad ground and make the readings fluctuate. Cleaning, reinstallation, adjusting to proper torque and calibrating may be all that is necessary for repair.

Note: For 850 use the Dynamic LED for the left reading and Static LED right reading.

For the 700 balancer use the Dynamic LED for the left and Alloy LED for the two right piezo's.

When checking these two balancers only use the left display readings (rounded off to 3 places).

Code 52 (Shift 0 - 52)	Code 27
950/1050, 1025, 700	850

Replacement Procedures Section for Models 950,1025, 1050, & 1055 Balancers

The procedures in this section will aid in replacing major sub-assemblies of the balancer.

Do not disassemble, adjust or replace any part before performing the PRELIMINARY INSPECTION and FUNCTIONAL CHECK PROCEDURES. These procedures, along with the troubleshooting flow charts, will isolate the necessary adjustment or replacement. Perform checks in the order listed and exactly as specified.

Refer to the illustrated parts breakdowns and parts lists in the back of the manual for parts identification. Standard commercial fittings and fasteners are used throughout and should be obtained locally.

Check all interconnecting wiring and connectors when an electrical malfunction is indicated. Check all fittings and fasteners when a mechanical malfunction is indicated.

Front Panel/Printed Circuit Board Assembly

Important: Never replace the printed circuit board without first checking the contactor coil resistance whenever any of the following symptoms occur. Shorted contactor coils will result in failure of the new printed circuit board.

1. Displays do not light.

2. Drive motor does not start.

3. Drive motor does not stop.

Contactor Coil Resistance Measurement

1. Unplug the balancer.

2. Disconnect the plug from the right side of printed circuit board assembly.

3. Set ohmmeter to lowest scale.

4. Measure the resistance from terminals A1 to A2 on both the start and brake contactors.

5. Resistance should be 3 to 5 ohms (5 to 7 ohms on newer contactors with metal plate on the bottom), if not, replace the contactor.

New Repair Procedure: The models 950,1025,1050, and 1055 are different from other COATS balancers in that the Front Panel/ Printed Board assembly has been designed so that the PCB Assembly and the Touch Panel/ Aluminum Back Panel can be replaced separately. Refer to the Trouble Shooting section for diagnostic instructions for isolating the defective assembly.

Front Panel/Printed Circuit Board Assembly Replacement

1. Unplug the balancer.

2. Check contactor coil resistances, see the procedure on page 24.

3. Remove the four (4) 6-32 acorn nuts on the back of the pod.

4. Disconnect the plugs on the PCB Assembly.

5. Remove the Front Panel/Printed Circuit Board Assembly.

6. Connect the plugs to the new PCB Assembly.

7. Line up the four (4) 6-32 studs on the back of the Touch Panel/Aluminum Back Panel with the four (4) holes in the pod and install.

8. Install the four (4) 6-32 acorn nuts.

9. Plug in the balancer.

10. Perform the 950/1050 Balancer Test Procedure.

11. Perform the FUNCTIONAL CHECKS.

Touch Panel/Aluminum Back Panel And PCB Assembly

1. Unplug the balancer.

2. If the PCB is being replaced, check contactor coil resistances, see the procedure on page 24.

3. Remove Front Panel/PCB Assembly from the pod.

4. Remove the eight (8) screws holding the PCB Assembly to the Touch Panel/Aluminum Back Panel.

5. Disconnect the plug going to the PCB Assembly.

6. Replace the defective Touch Panel/Aluminum Back Panel or PCB Assembly and connect the plug from the Touch Panel/Aluminum Back Panel to the PCB Assembly.

Note: Make sure there are no twists or kinks in the cable.

7. Install the eight (8) screws holding the PCB assembly to the Touch Panel/Aluminum Back Panel.

8. Install Front Panel/PCB Assembly to the pod.

9. Plug in the balancer

10. Perform the FUNCTIONAL CHECKS.

Hood Magnet

1. Remove the rubber hood stop from the hood bracket on the chassis.

2. Lean the hood back as far as it will go.

3. Remove the magnet from the hood bar.

4. Install the new magnet.

5. Place the hood in the down position and install the rubber hood stop.

6. Check to make sure that the motor starts with the hood down but not with it up.

7. Perform the FUNCTIONAL CHECKS.

Magnetic Hood Switch

1. Unplug the balancer.

2. Remove two (2) 6-32 x 1/2 screws holding hood switch to hood bracket and remove hood switch.

3. Disconnect two (2) wires going to hood switch.

4. Connect wires to new hood switch and install.

5. Plug in the balancer.

6. Check to make sure that the motor starts with the hood down but not with it up.

7. Perform the FUNCTIONAL CHECKS.

*Mechanical Hood/Interlock Switch

1. Unplug the balancer.

2. Drill out the four (4) pop rivits holdint the sheld in place.

3. Remove the screw and nut holding the switch.

4. Disconnect two (2) wires going to hood or interlock switch.

5. Connect wires to new hood or interlock switch and install.

Note: The two (2) switches are wired differently, one is normally open and the other is normally closed. Refer to the wiring diagram for correct wiring.

6. Replace the sheld.

7. Plug in the balancer.

8. Check to make sure that the motor starts with the hood down but not with it up.

9. Perform the FUNCTIONAL CHECKS.

On/Off Switch

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Disconnect wiring to on/off switch.

4. Squeeze the retainers at the top and bottom of the switch and push it through the opening in the power panel and chassis.

5. Install new on/off switch.

6. Connect wires.

7. Install weight tray and weight tray shield and plug in balancer.

8. Perform the FUNCTIONAL CHECKS.

Circuit Breakers

There are four (4) circuit breakers three (3) breakers if the unit has a Motor Controller PCB) located on the top of the Power Panel. Refer to the Wiring Diagrams for circuit location. The replacement procedure for each is the same.

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Disconnect wiring to circuit breaker.

4. Squeeze the retainers on both sides of the circuit breaker and push it through the power panel and chassis.

5. Install new circuit breaker.

6. Connect wires.

7. Install weight tray and weight tray shield and plug in balancer.

8. Perform the FUNCTIONAL CHECKS.

Transformer

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Remove the two (2) 8-32 x 1/2 screws and remove the transformer from the Power Panel.

4. Record wire color and corresponding transformer terminal numbers.

5. Disconnect wiring to transformer.

6. Connect wiring to transformer.

⚠ CAUTION

Transformer wiring must be transferred to new transformer exactly as connected previously. Failure to perform this important step properly may result in damage to transformer, balancer wiring, or printed circuit board. (See Wiring Diagram).

7. Install new transformer to Power Panel.

8. Install weight tray and weight tray shield and plug in balancer

9. Perform the FUNCTIONAL CHECKS.

Contactor

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Loosen the power cable clamp on the back of the chassis and push one or two feet of cable into the chassis.

4. Remove three (3) 6-32 x 1/2 screws holding power panel to chassis and set power panel on top of bracket in center of balancer to facilitate wire removal.

5. Record the wire numbers and the corresponding contactor terminal location.

6. Disconnect wires at contactor.

7. Loosen two (2) 8-32 x 3/4 screws holding contactor and slide out contactor.

8. Install new contactor and connect wiring.

⚠ CAUTION

Contactor wiring must be transferred to new contactor exactly as connected previously. Failure to perform this important step can result in damage to contactor, drive motor, balancer wiring and printed circuit board. (See Wiring Diagram).

Note: For ease of installation, the motor wires are numbered corresponding to the motor terminal numbers on the wiring diagram.

9. Install Power Panel.

10. Pull power cable out of chassis and tighten power cable clamp.

11. Install weight tray and weight tray shield and plug in balancer.

12. Perform the FUNCTIONAL CHECKS.

Auxiliary Contactor Block

1. Perform steps 1 through 4 of Contactor Replacement Procedure.

2. Disconnect wiring from auxiliary contact block.

3. Lift the white lever that is on the top of the contactor block and slide the contactor block off the contactor.

4. Install new contactor block and connect wiring.

⚠ CAUTION

Follow the same precautions as outlined in step 8 of the CONTACTOR REPLACEMENT PROCEDURE.

5. Perform steps 9 through 12 of CONTACTOR REPLACEMENT PROCEDURE.

Bridge Rectifiers

Note: See checking procedure on page 23.

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Identify and record wire locations.

4. Disconnect wiring from bridge rectifier.

5. Remove the 8-32 x 3/4 screw holding the bridge rectifier to the power panel.

6. Place a small amount of thermal grease on back of the bridge rectifier and install the new bridge rectifier.

7. Connect wiring.

⚠ CAUTION

The wires must be transferred to new bridge rectifier exactly as connected previously.

8. Plug in the balancer.

9. Check bridge rectifier as outlined in TROUBLESHOOTING SECTION.

10. Install weight tray and weight tray shield.

11. Perform the FUNCTIONAL CHECKS.

A & D Arm Assembly

Note: The Model 950 uses a manual Distance Gauge Assembly. The model 1050 uses an automatic Distance (A) and Diameter (D) Gauge Assembly. These assemblies are repairable. Refer to the illustrated parts breakdown and parts lists in the back of this manual for individual parts identification.

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Model 1050, disconnect plugs.

4. Remove three (3) 1/4-20 flange nuts holding gauge assembly.

5. Remove gauge assembly.

6. Install new or repaired gauge assembly.

7. Model 1050, connect plugs.

8. Plug in the balancer.

9. Model 1050, perform A & D Arm Calibration Procedure.

10. Install weight tray and weight tray shield.

11. Perform the FUNCTIONAL CHECKS.

Fan Motor Assembly

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Disconnect fan motor plug.

4. Remove rear end bell cover.

5. Remove the two (2) 8-32 nuts holding the fan motor to the drive motor and remove the fan motor assembly.

6. Install new fan motor assembly and tighten nuts.

7. Connect fan motor plug.

8. Install weight tray and weight tray shield and plug in balancer.

9. Perform PRELIMINARY INSPECTION and FUNCTIONAL CHECKS.

Rotary Shutter

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Remove rear end bell cover.

4. Remove the 3/8 by 3/8 shoulder bolt and the rotary shutter.

Note: Some motors will have a plastic shim, part number 8-143988 between the rotor and the rotary shutter. Leave this shim in place when replacing the rotary shutter.

5. Install the new rotary shutter.

6. Put Loctite 242 or equivalent on the 3/8 shoulder bolt threads, install and tighten.

7. Install rear end bell cover.

8. Install weight tray and weight tray shield and plug in balancer.

9. Perform the FUNCTIONAL CHECKS.

Optical Encoder Assembly

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Remove rear end bell cover.

4. Remove rotary shutter.

5. Disconnect optical encoder plug.

6. Slide optical encoder from aluminum rear end bell casting.

Note: Some motors will have a plastic shim behind the optical encoder. Leave this shim in place when replacing the optical encoder.

7. Install new optical encoder.

8. Install rotary shutter.

9. Install rear end bell.

10. Connect optical encoder plug.

11. Install weight tray and weight tray shield and plug in balancer.

12. Perform the FUNCTIONAL CHECKS.

Drive Motor Assembly

Hennessy now has available a service motor kit for the 950/1025/1050/1055 Contactor & Solid State Balancers which will allow everyone to use one part number when ordering a motor. The kit will be a complete motor assembly, hardware bag, & wiring instructions. The hardware bag will contain wires, wire nuts, spade connectors & a green phoenix connector. It will require a crimping tool to crimp the spade connectors to motor wires as needed for contactor style units. Refer to the Motor Service Kit instructions in this manual for additional information.

1. Unplug the balancer.

2. Remove weight tray, weight tray shield and motor cover.

3. Disconnect fan motor plug.

4. Disconnect optical encoder plug.

5. Disconnect each motor wire where it is connected to the contactor and auxiliary contactor block.

6. Remove the four (4) piezo springs and piezo spring retainers.

7. Remove the two (2) 5/16 - 18 X 1 washer head screws and lift out the motor assembly.

8. Position the motor on its side or back and remove the four (4) 3/8 - 16 washer head screws holding the flex plate to the motor.

9. Remove the flex plate.

10. Remove the four (4) 3/8 - 16 washer head screws holding the cradle to the motor.

11. Remove the cradle from the motor.

12. Apply Loctite 242 to the threads of the 3/8 -16 washer head screws and install the cradle on the new motor.

13. Clean and apply Loctite to the surface of the flex plate and the cradle where they mate.

14. Apply Loctite 242 to the threads of the 3/8 - 16 washer head screws and install the flex plate on the cradle.

15. Ensure balls are inserted into each piezo assembly.

Note: Current piezos have the ball molded into the top casting

16. Install motor.

17. Install 5/16 - 18 X 1 washer head screws holding flex plate to chassis.

18. Install piezo springs, piezo retainers and 3/8 - 16 Nyloc nuts.

19. Tighten the Nyloc nuts until the distance from the top of the motor cradle to top of the piezo spring retainer is two (2) inches.

20. Connect fan motor plug.

21. Connect optical encoder plug.

22. Connect drive motor wires to the contactor and auxiliary contactor block.

Note: Each motor wire is numbered corresponding to the motor terminals on the wiring diagram.

22. Install the weight tray, weight tray shield and motor cover and plug in the balancer.

23. Perform the FUNCTIONAL CHECKS.

Piezo Assembly

Note: See checking procedure in this manual before replacing piezos.

1. Unplug the balancer.

2. Remove weight tray, weight tray shield and motor cover.

3. Remove the four (4) 3/8 - 16 Nyloc spring retaining nuts, spring retainers and piezo springs.

4. Remove the two (2) 5/16 - 18 X1 washer head screws.

5. Disconnect the fan motor and optical encoder plugs.

6. Note wire colors and disconnect wires to piezo assemblies.

7. Lift up on the motor and twist and lift the piezo assemblies to remove from the chassis.

Note: The piezo assemblies used in the models 950 and 1050 balancers are different from other Coats balancers in that they are held in position by studs in the bottom of the piezo carriers that fit into holes in the chassis. New piezos have the ball molded into the top casting.

8. Use emery cloth to clean the mounting surfaces of the piezo assemblies and chassis, install new piezo assemblies and connect wires.

9. Install the two (2) 5/16 - 18 X1 washer head screws.

10. Install piezo springs, spring retainers and Nyloc nuts.

11. Tighten the Nyloc nuts until the distance from the top of the motor cradle to the top of the retainer is two (2) inches.

12. Connect the fan motor and optical encoder plugs.

13. Install weight tray, weight tray shield and motor and plug in balancer.

14. Perform the FUNCTIONAL CHECKS.

Capacitor Assembly

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Disconnect plug to capacitor assembly.

4. Remove four (4) 6 - 32 X 1/2 screws holding capacitor panel to chassis

5. Install new capacitor assembly.

6. Connect plug.

7. Install weight tray, weight tray shield and plug in balancer.

8. Perform PRELIMINARY INSPECTION and FUNCTIONAL CHECKS.

Capacitor

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Disconnect plug to capacitor assembly.

4. Remove three (3) 6 -32 X 1/2 screws holding capacitor clamps to capacitor panel and remove capacitor clamps.

5. Remove capacitors. Note wire locations, disconnect wires from capacitors and transfer wires to new capacitors

Note: Only one capacitor should have a resistor connected across its terminals. If both new capacitors have resistors, cut one out.

6. Install capacitors.

7. Connect plug.

8. Install weight tray, weight tray shield and plug in balancer.

9. Perform PRELIMINARY INSPECTION and FUNCTIONAL CHECKS.

Signal Harness

1. Unplug the balancer.

2. Remove weight tray and weight tray shield.

3. Remove Front panel /PCB Assembly.

4. Disconnect plugs from PCB assembly.

5. Disconnect signal harness connections inside chassis.

6. Cut tie wrap securing signal harness to chassis.

7. Pull harness out of hole in back of chassis and then up through pod support tube and out through pod.

8. Install new signal harness.

9. Connect signal harness connections inside chassis. Refer to wiring diagram.

Note: All signal harnesses come wired for the model 950. When installing a signal harness in a model 1025 remove the jumper between 15 to 17. For a1050/55 remove the jumpers from terminals 15 to 17 and 16 to 18 on the 18 pin connector.

10. Connect plugs to PCB assembly.

11. Install Front Panel/PCB assembly.

12. Install weight tray and weight tray shield.

13. Perform the FUNCTIONAL CHECKS

Repair Procedures for the A & D Arm Assembly

A Pulley Removal

1. Rotate the pulley counterclockwise and remove the brass stop and cable from the catch groove on the pulley.

2. Loosen the cap screw on the pulley and carefully slide the pulley and return spring from the shaft of the potentiometer.

A Pulley Installation/Adjustment (Code 10)

1. Locate the return spring onto the A pulley. Install the tension spring to the retaining pin on the pulley, ensuring that the spring coils counterclockwise from the inside to the outside.

2. Catch the outside loop on the end of the return spring onto the tension pin on the A & D bracket.

3. Slide the A pulley onto the shaft of the potentiometer.

4. Rotate the A pulley counterclockwise one (1) turn and loop the cable from the distance gauge around the pulley.

5. Install the cable and brass stop assembly into the groove on the pulley.

6. Locate the A pulley on the shaft of the potentiometer such that the cable assembly from the distance gauge is located in the center of the pulley groove and the cable is not contacting the edge of the pulley groove.

7. Press and hold the SHIFT key and press 0. Press 1 and the 0.

8. Using a small screw driver, rotate the end of the potentiometer shaft until the left weight display reads between .10 and .20.

9. Lock the pulley in place by tightening the cap screw on the pulley.

⚠ CAUTION

Do not over tighten. Over tightening may cause the pulley to crack.

10. See A & D ARM CALIBRATION PROCEDURE on page 10 - 11.

11. See WEIGHT SENSOR CALIBRATION PROCEDURE on page 9 - 10.

A Potentiometer Replacement

1. Remove the A pulley, see the procedure under topic A PULLEY REMOVAL on page 34.

2. Unplug the three (3) wires form the A potentiometer from the wiring harness.

3. Remove the wires for the A potentiometer from the A & D Bracket.

4. Remove the potentiometer retaining nut lockwasher, and the potentiometer.

5. Install the new potentiometer, lockwasher, and retaining nut.

6. Install the potentiometer wires to the A & D Bracket using a small mount of silicone sealer/adhesive.

7. Connect the wires for the A potentiometer to the wiring harness.

8. Install the A pulley, see the procedure under A PULLEY INSTALLATION in this guide.

D Pulley Removal

1. Rotate the pulley clockwise and remove the brass stop and cable from the catch groove on the pulley.

2. Loosen the cap screw on the pulley and carefully slide the pulley and return spring from the shaft of the potentiometer.

D Pulley Installation/Adjustment (Code 10)

1. Completely back off the plunger stop pin.

2. Locate the return spring onto the D pulley. Install the tension spring to the retaining pin on the pulley, ensuring that the spring coils clockwise from the inside to the outside.

3. Slide the D pulley onto the shaft of the potentiometer.

4. Catch the outside hook on the end of the return spring onto the tension pin on the A & D bracket.

5. Rotate the D pulley clockwise approximately 3/4 of a turn and loop the cable from the distance gauge around the pulley.

6. Install the cable and brass stop assembly into the groove on the pulley.

7. Locate the D pulley on the shaft of the potentiometer such that the cable assembly from the distance gauge is located in the center of the pulley groove and the cable is not contacting the edge of the pulley groove.

8. Press and hold the SHIFT key and press 0. Press 1 and the 0.

9. Using a small screw driver, rotate the end of the potentiometer shaft until the right display reads between .50 and .60.

10. Lock the pulley in place by tightening the cap screw on the pulley.

⚠ CAUTION

Do not over tighten. Over tightening may cause the pulley to crack.

11. Turn the plunger pin out until the D pot value is 0.05 to 0.10 than the value that was obtained in step 9 of this procedure.

12. See the A & D ARM CALIBRATION PROCEDURE on page 10 - 11.

13. See the WEIGHT SENSOR CALIBRATION PROCEDURE on page 9 - 10.

D Potentiometer Replacement

1. Remove the D pulley, see the procedure under topic D PULLEY REMOVAL.

2. Unplug the three (3) wires form the D potentiometer from the wiring harness.

3. Remove the wires for the D potentiometer from the A-D Bracket.

4. Remove the potentiometer retaining nut, lockwasher, and the potentiometer.

5. Install the new potentiometer, lockwasher, and retaining nut.

6. Install the potentiometer wires to the A-D Bracket using a small mount of silicone sealer/adhesive.

7. Connect the wires for the D potentiometer to the wiring harness.

8. Install the D pulley, see the procedure under D PULLEY INSTALLATION.

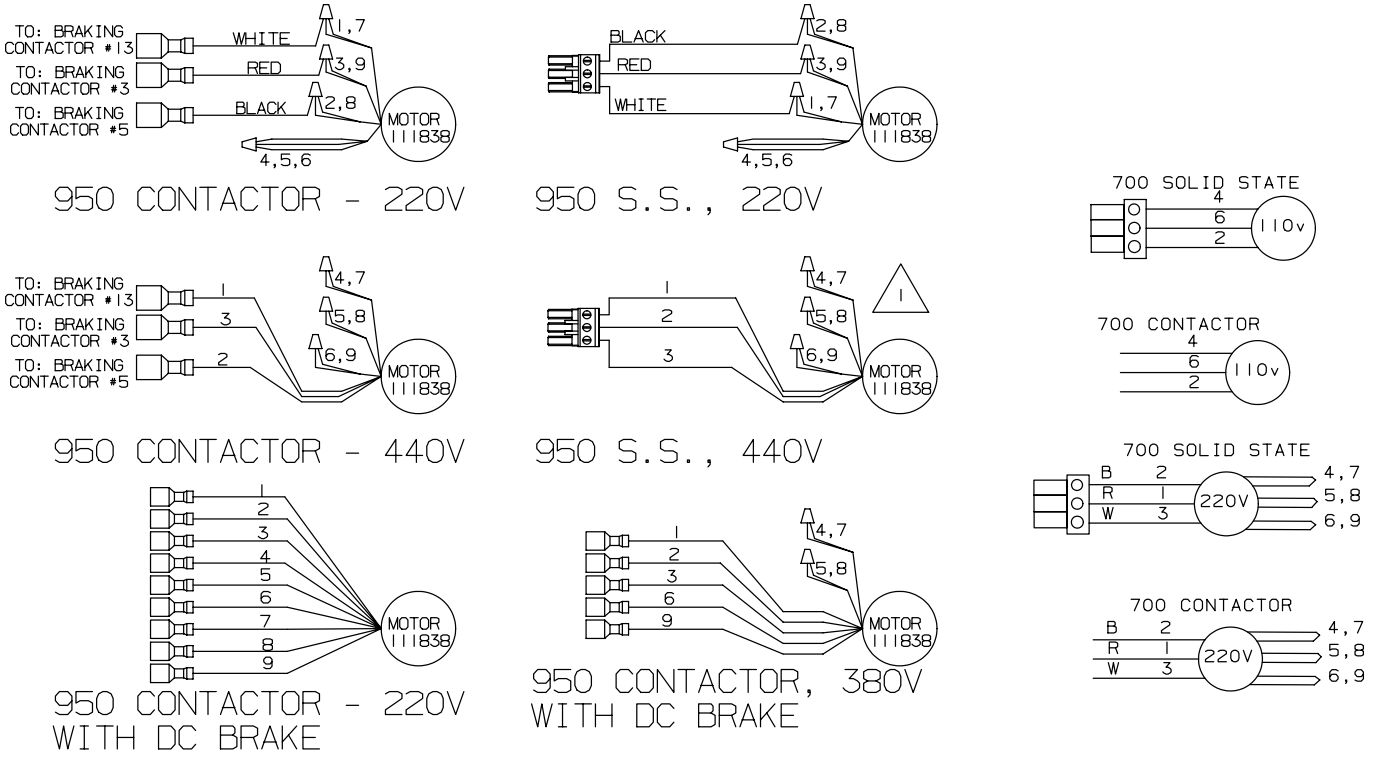
*Motor Service Kit Instructions

Hennessy now has available a service motor kit for the 950/1025/1050/1055 Contactor & Solid State Balancers which will allow everyone to use one part number when ordering a motor. The kit will be a complete motor assembly, hardware bag, & wiring instructions. The hardware bag will contain wires, wire nuts, spade connectors & a green phoenix connector. It will require a crimping tool to crimp the spade connectors to motor wires as needed for contactor style units.

Part No.	Description
8112945	Motor Replacement Kit

CAUTION

Remember to unplug the balancer before servicing.



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REV

*950 Pro Racer

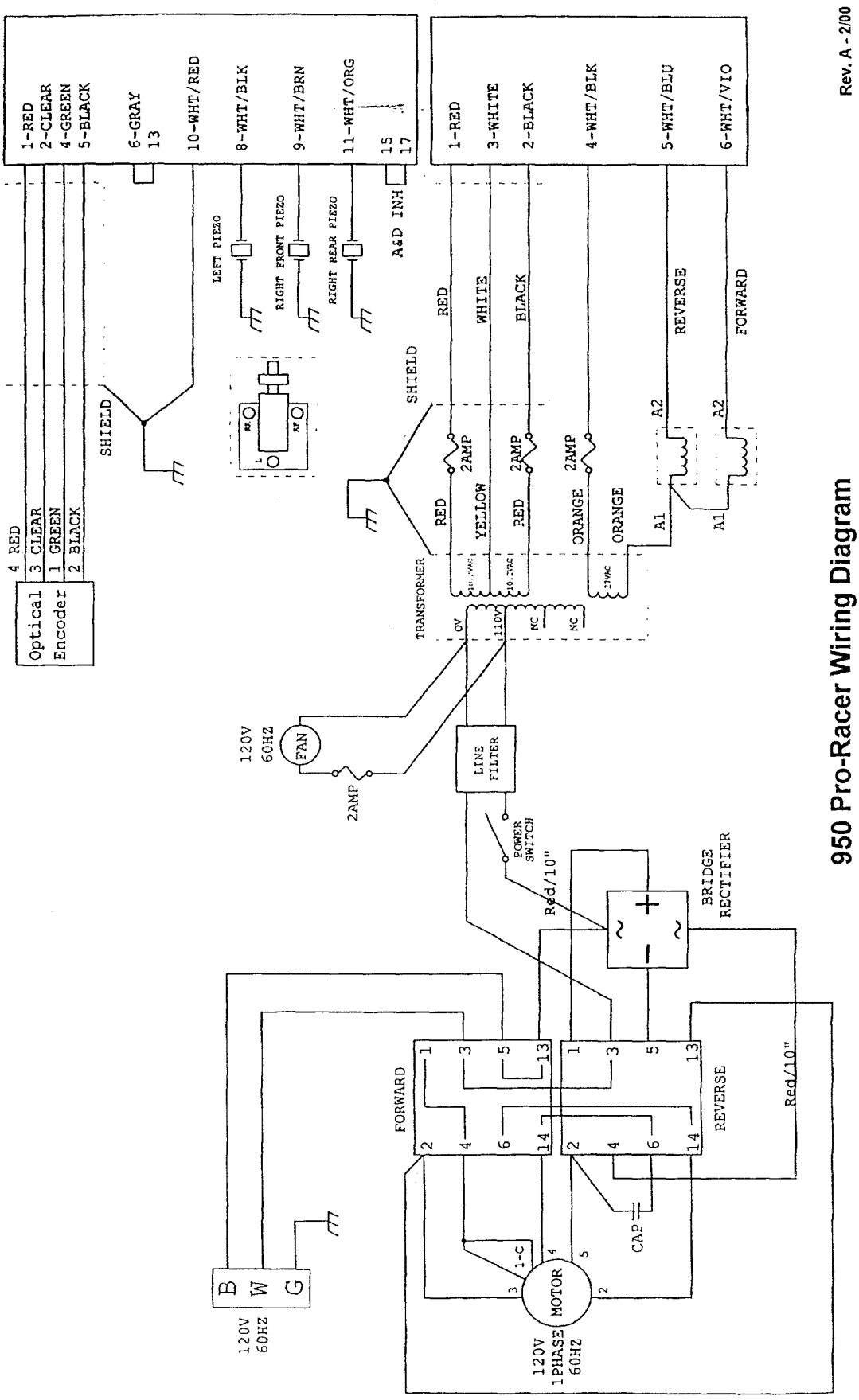
Hennessy is proud to announce the 950 Pro Racer Balancer. This machine is a 950 contactor style machine with new software for racing wheels and utilizes a 1001 balancer motor. The 950/1050 Service Manual and Calibrating instructions should be used when servicing this unit along with the attached wiring diagram and parts list.

CAUTION

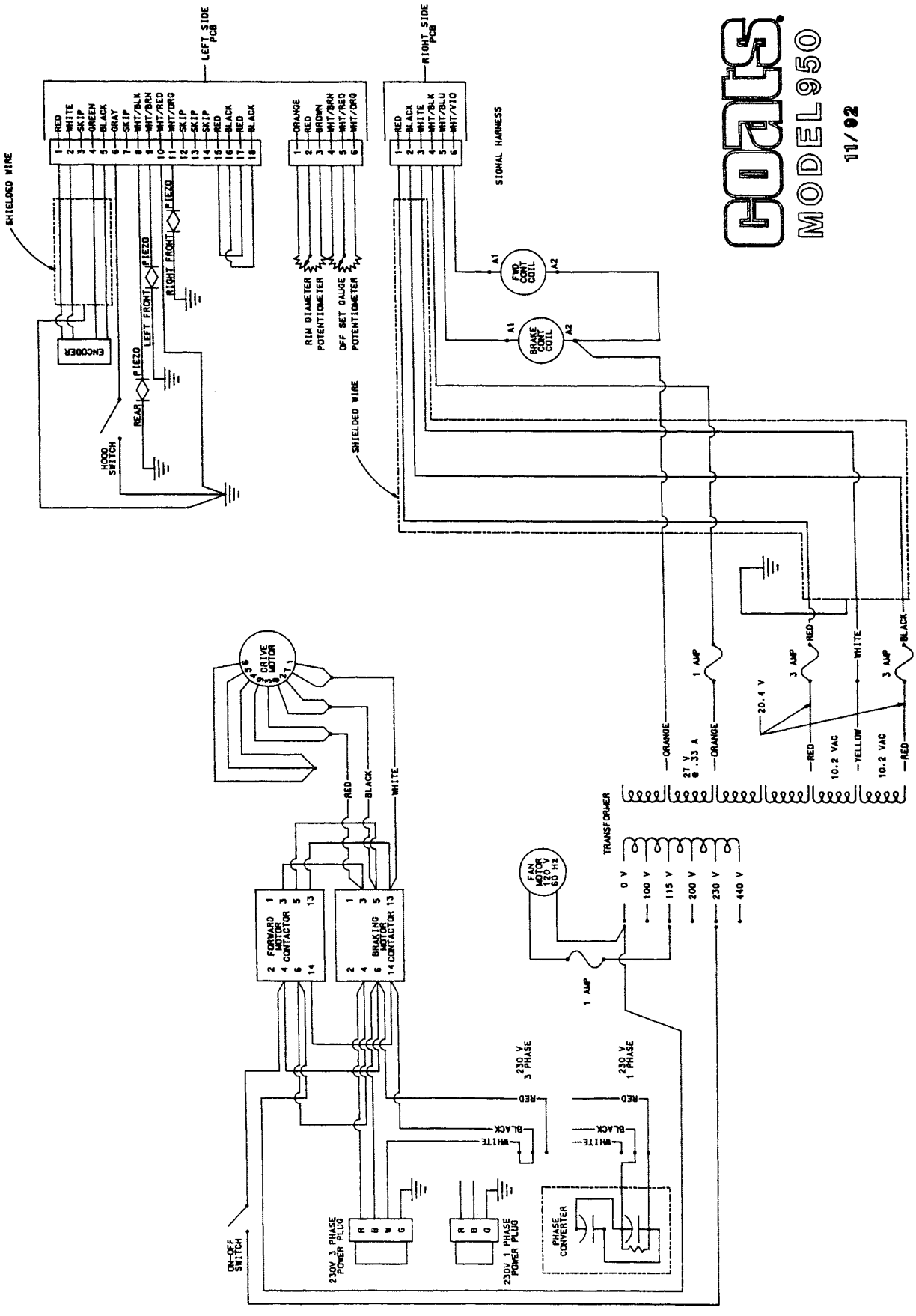
The PCB part number is Different due to the software (8112850). The CPU chip may be changed with a standard 950/1050 PCB (8110946/8111886) in the event you have a machine down condition for a PCB problem.

Note: The piezo spring tension should be adjusted to the same spec as the 950/1050 which is 2". All other troubleshooting procedures remain the same as the 950/1050.

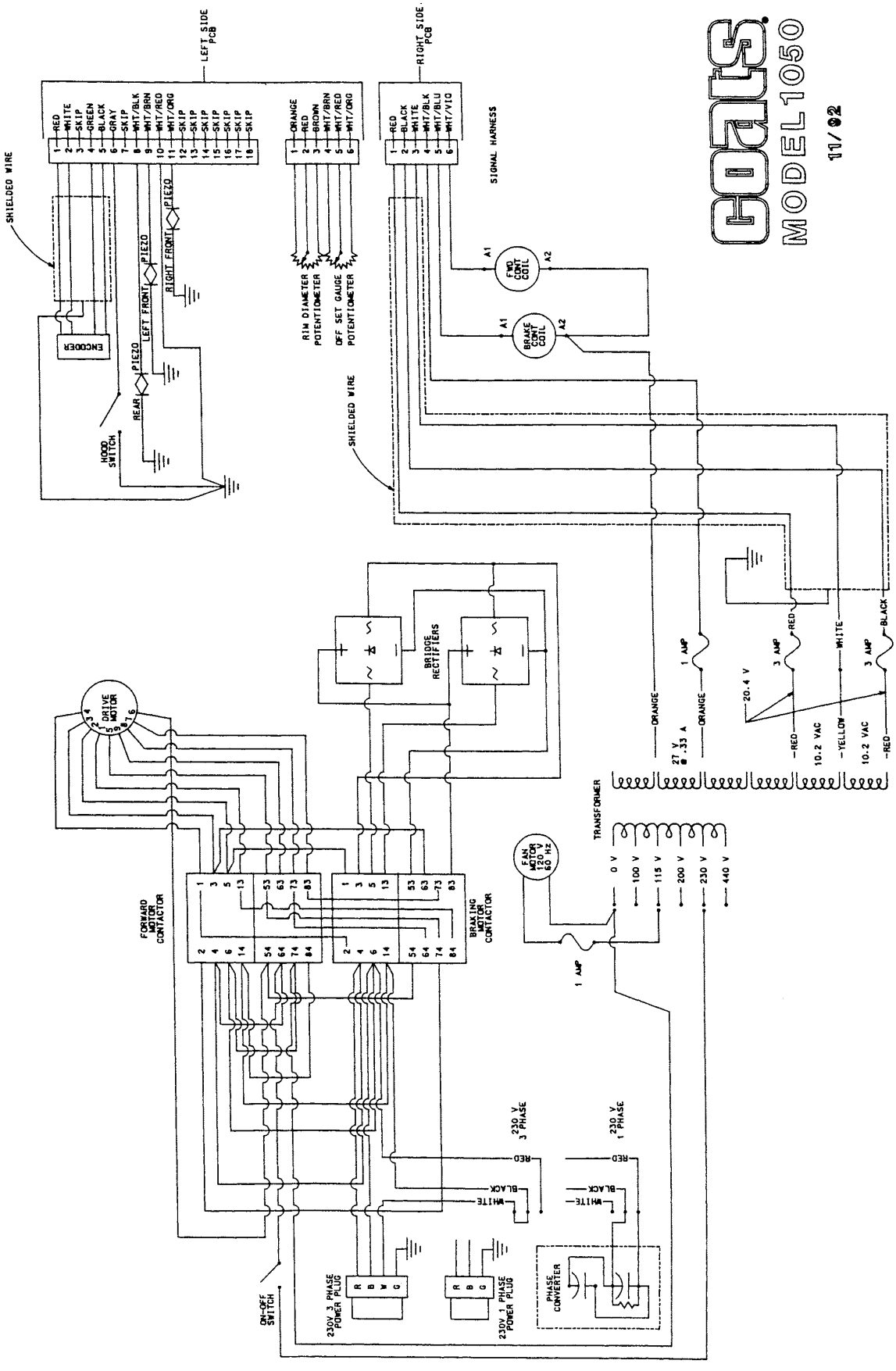
***950 Pro Racer Wiring Diagram**



*950 Wiring Diagram (Contactor Style)



*1050 Wiring Diagram (Contactor Style)



*Solid State Wiring Diagrams & Troubleshooting Guides

***For units produced after 1/1/98.**

A new Solid State Motor Controller replaced the mechanical contactor and a second hood (Interlock) switch was added.

In January of 2000 the magnetic switches were changed to mechanical switches, refer to the appropriate wiring diagram for troubleshooting and repair.

***Mechanical Hood Switches**

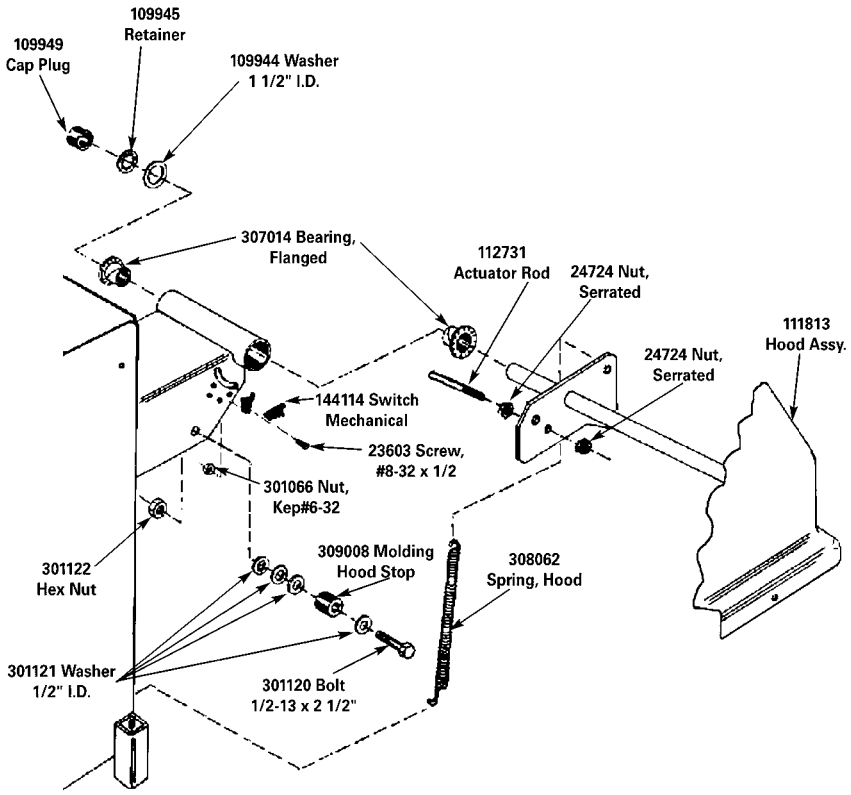
Hennessy has introduced a new style hood switch on the 850and 950/1025/1050/1055 solid state model balancers. Beginning with Serial # 0001308154. These are mechanical rather than magnetic switches and require a different activating procedure. As a result the hood bracket on the balancer and hood bar have been redesigned. These parts are not reverse compatible therefore you will still need to carry the previous magnetic switches & magnets (8305050 & 8112414) in your service inventory.

⚠ CAUTION

Please use caution when installing the hood bar into the machine being careful not to damage the switch lever with the actuating rod. Note - a piece of Styrofoam has been inserted as packing material to insure adequate room for inserting the actuator rod. Please refer to the attached Hood Installation Instructions and wiring diagrams. The operators manuals have been updated with current parts lists and additional copies can be ordered through our order entry department.

Old Part Number	New Part Number	
8305050	8144114	Switch
8110014	8112843	Hood Bar
	8112731	Actuator Rod
	924724	Serrated Nut
	8111812	850S Operator Manual
	8111868	950 thru 1055 Operators Manual

*Mechanical Hood Switch Diagram



*1050 Wiring Diagram (Motor Controller Style/Magnetic Switches)

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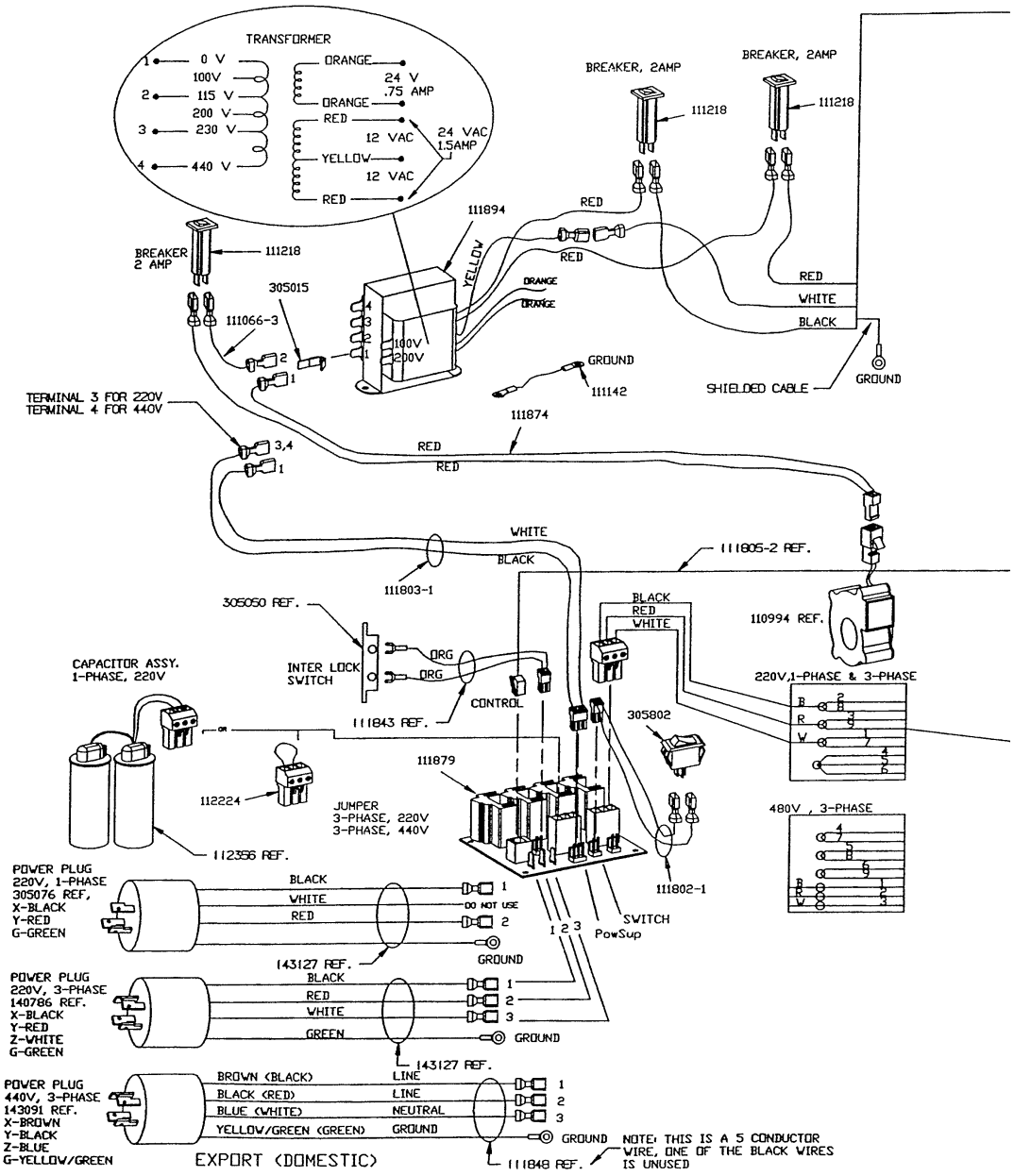
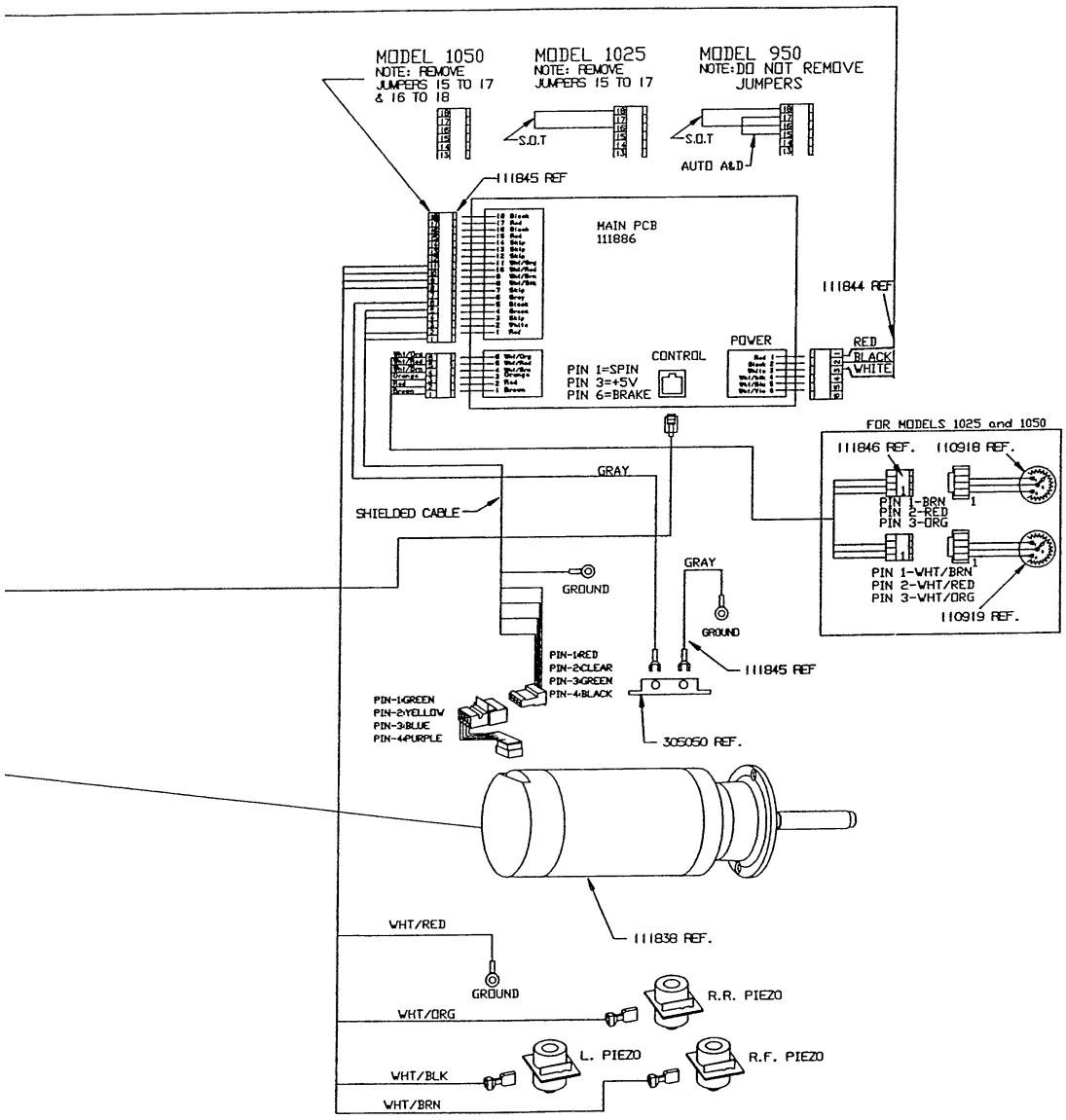
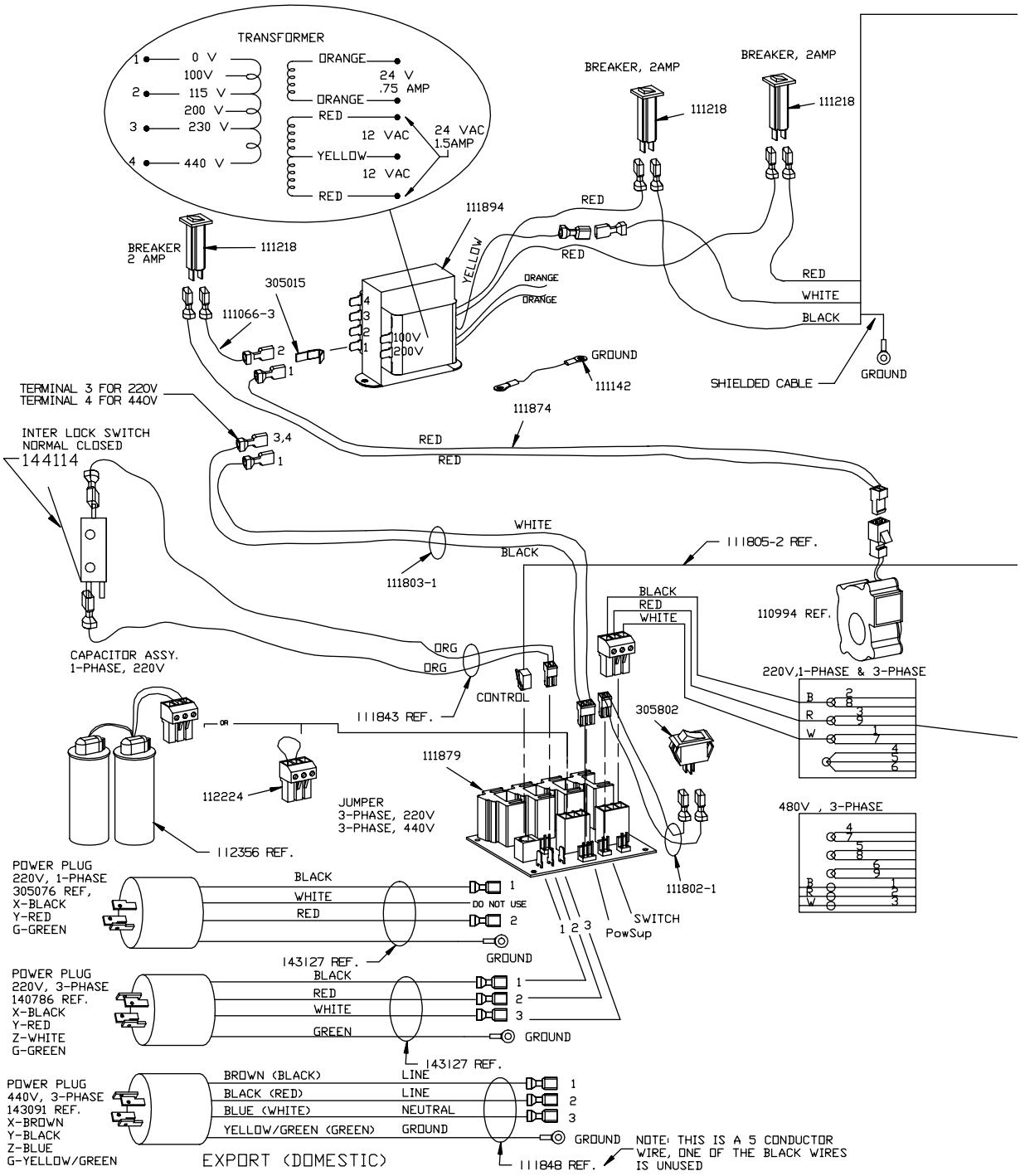
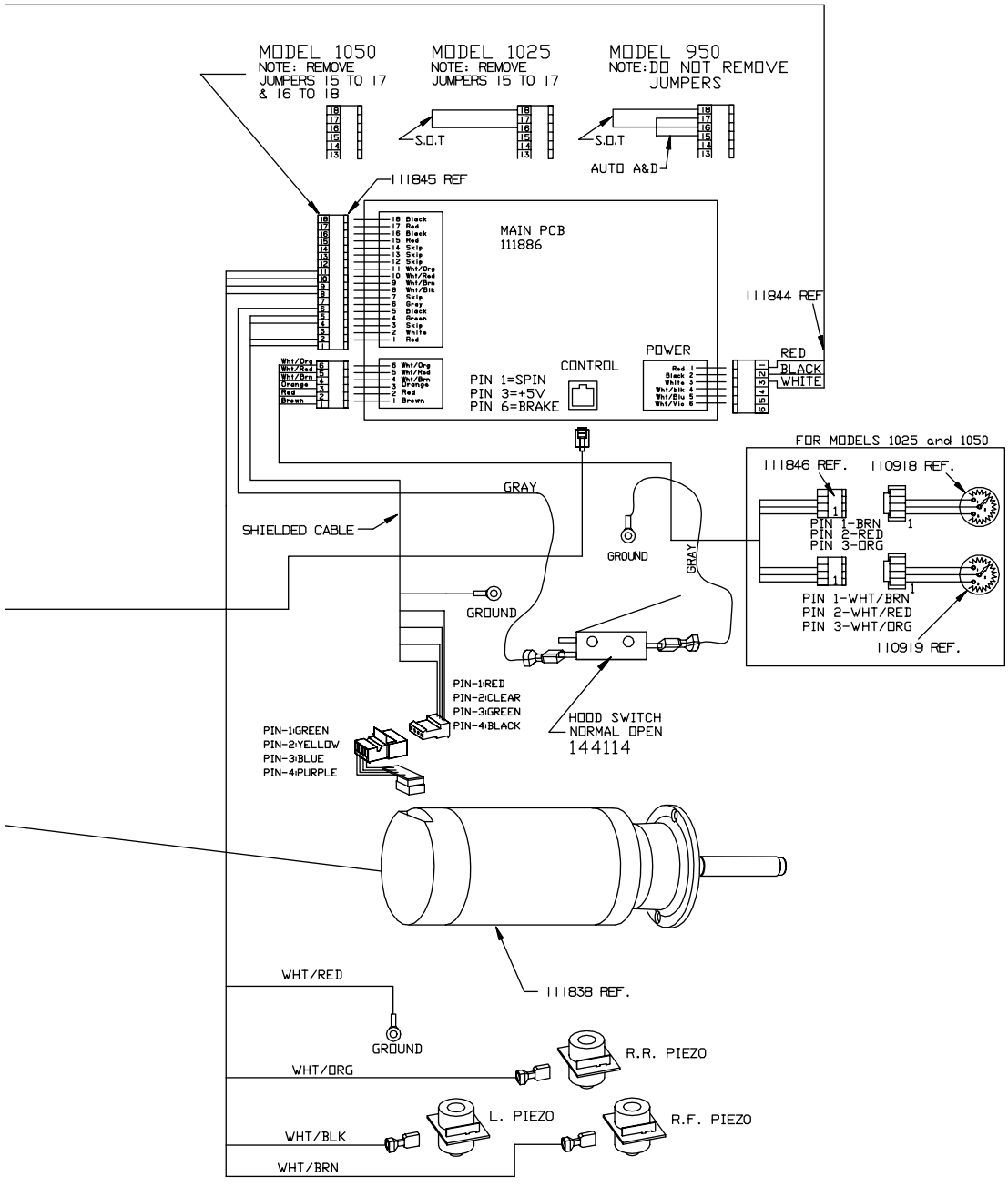




MODEL 1050 SOLID STATE
REV - A

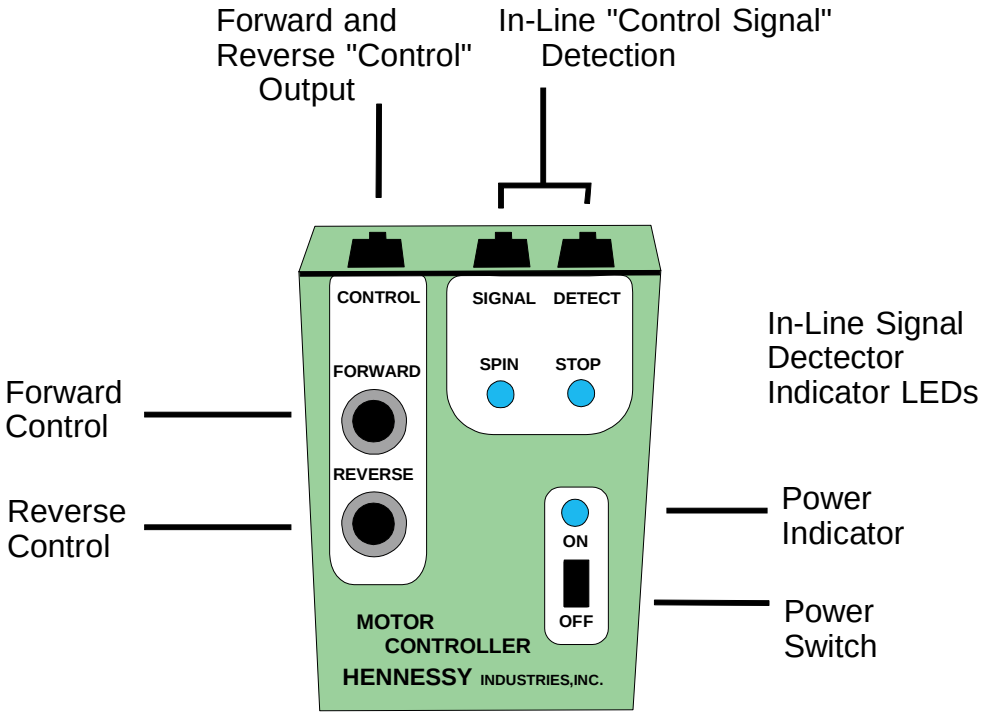
*1050 Wiring Diagram (Motor Controller Style/Mechanical Switches)

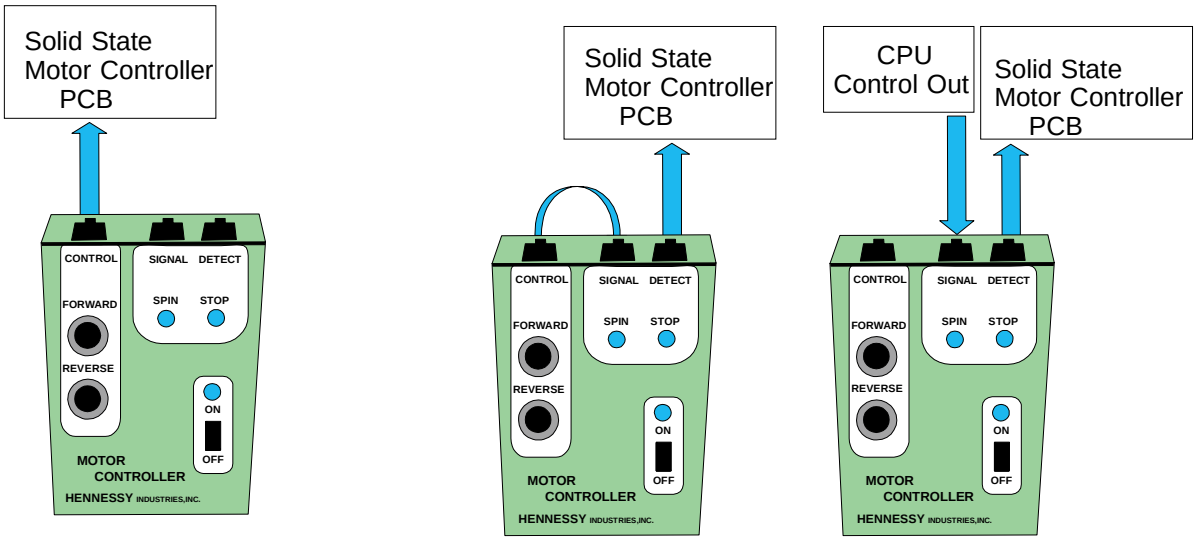




MODEL 950,1025 & 1050 SOLID STATE
REV - B

***Motor Controller Test Box #8112708**





Mode 1

Forward and Reverse buttons are used to control signals to the Solid State Motor Control PCB

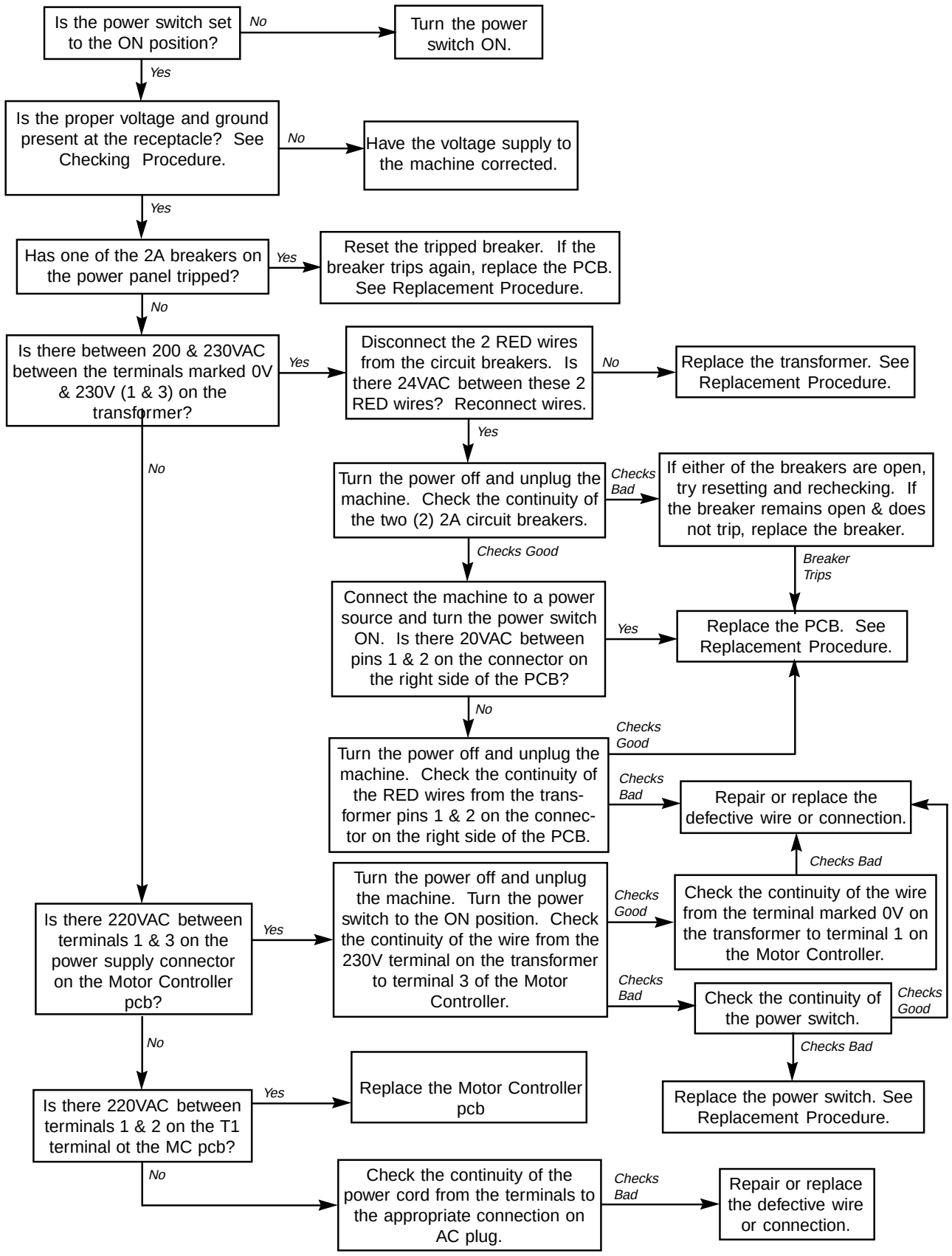
Mode 2

A Loop-back plug is connected from the Control Output back to the Signal Detection input to monitor the Control Signal output of the Diagostic Tool while manually applying the control signal.

Mode 3

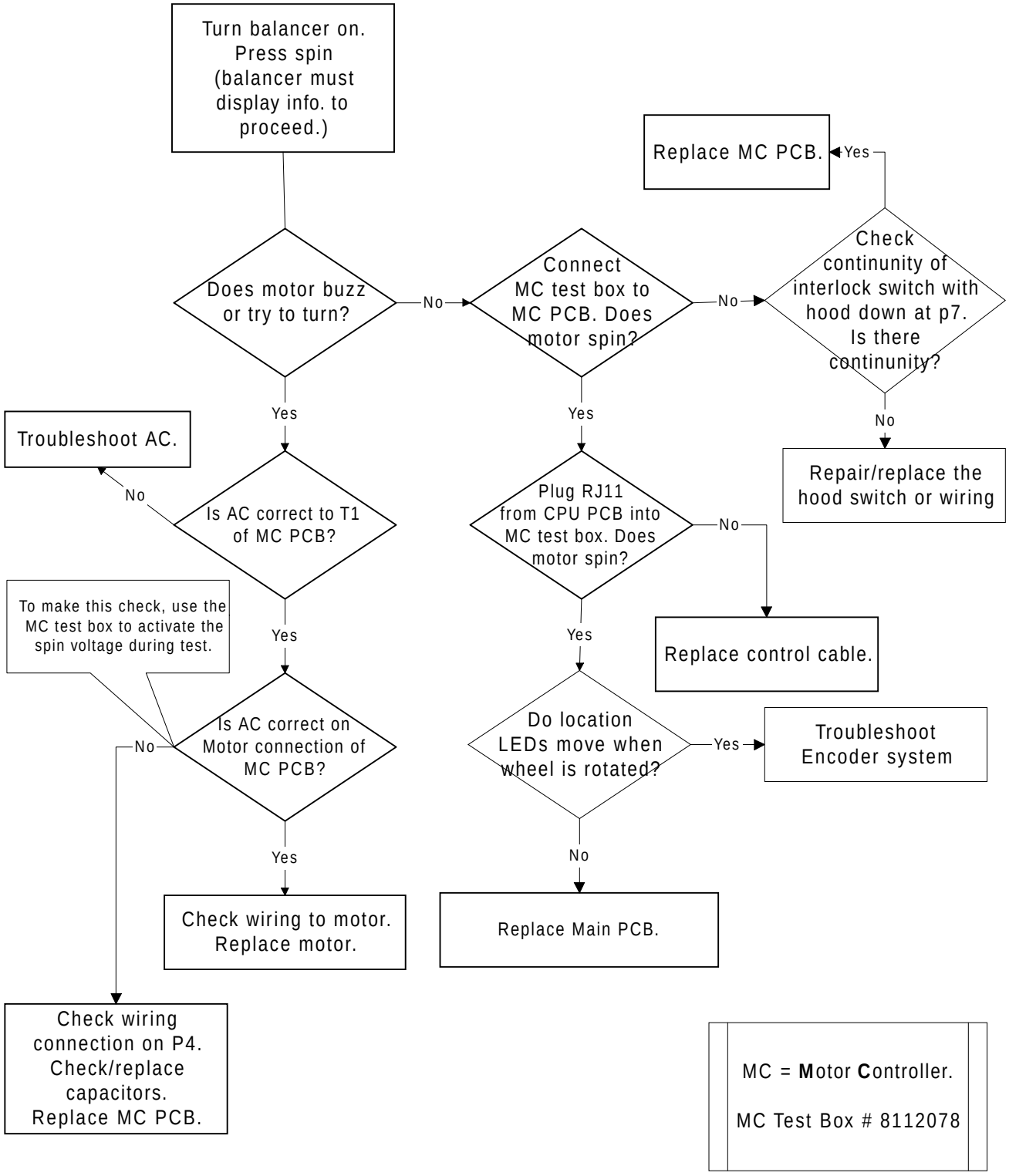
The Diagnostic Tool is connected in-line with the control cable from the CPU Motor Control output to give an indication of the presence of the Control signal

***Display Does Not Light (Solid State Motor Controller Model)**

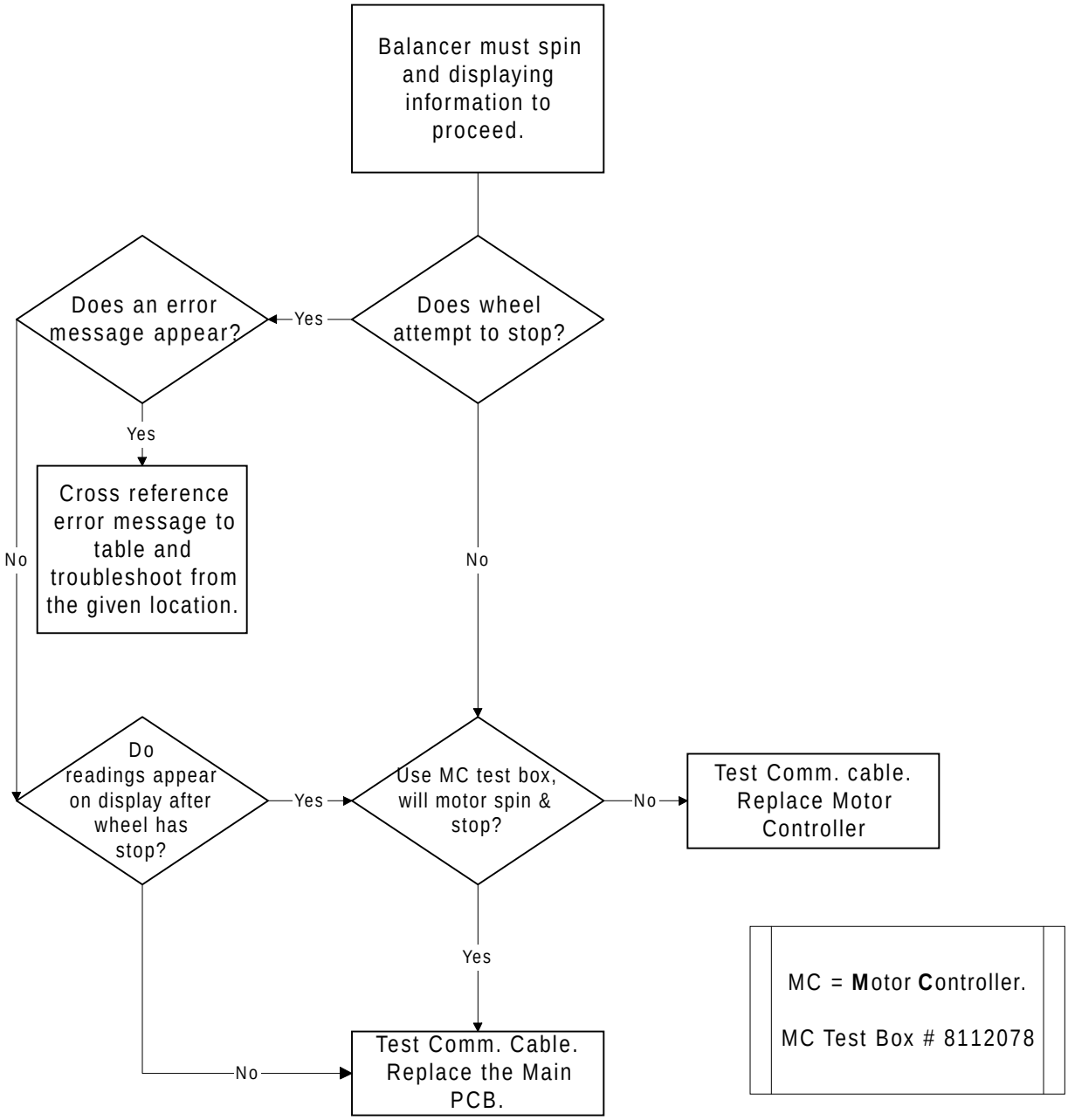

Is the power switch set to the ON position?
No
Turn the power switch ON.
Yes
Is the proper voltage and ground present at the receptacle? See Checking Procedure.
No
Have the voltage supply to the machine corrected.
Yes
Has one of the 2A breakers on the power panel tripped?
Yes
Reset the tripped breaker. If the breaker trips again, replace the PCB. See Replacement Procedure.
No
Is there between 200 & 230VAC between the terminals marked 0V & 230V (1 & 3) on the transformer?
Yes
Disconnect the 2 RED wires from the circuit breakers. Is there 24VAC between these 2 RED wires? Reconnect wires.
No
Replace the transformer. See Replacement Procedure.
Yes
No
Turn the power off and unplug the machine. Check the continuity of the two (2) 2A circuit breakers.
Checks Bad
If either of the breakers are open, try resetting and rechecking. If the breaker remains open & does not trip, replace the breaker.
Checks Good
Breaker Trips
Connect the machine to a power source and turn the power switch ON. Is there 20VAC between pins 1 & 2 on the connector on the right side of the PCB?
Yes
Replace the PCB. See Replacement Procedure.
No
Checks Good
Turn the power off and unplug the machine. Check the continuity of the RED wires from the transformer pins 1 & 2 on the connector on the right side of the PCB.
Checks Bad
Repair or replace the defective wire or connection.
Checks Bad
Is there 220VAC between terminals 1 & 3 on the power supply connector on the Motor Controller pcb?
Yes
Turn the power off and unplug the machine. Turn the power switch to the ON position. Check the continuity of the wire from the 230V terminal on the transformer to terminal 3 of the Motor Controller.
Checks Good
Check the continuity of the wire from the terminal marked 0V on the transformer to terminal 1 on the Motor Controller.
Checks Bad
Check the continuity of the power switch.
Checks Good
Checks Bad
Replace the power switch. See Replacement Procedure.
No
Is there 220VAC between terminals 1 & 2 on the T1 terminal ot the MC pcb?
Yes
Replace the Motor Controller pcb
No
Check the continuity of the power cord from the terminals to the appropriate connection on AC plug.
Checks Bad
Repair or replace the defective wire or connection.

***Balancer Does Not Cycle (Solid State Motor Controller Model)**

To use the following chart you will need a tire and wheel assembly mounted on the balancer, the hood closed, and the proper A, W, and D dimensions entered. If you are unable to manually enter the proper wheel dimensions, replace the touch panel.


Turn balancer on. Press spin (balancer must display info. to proceed.)
Does motor buzz or try to turn?
No
Connect MC test box to MC PCB. Does motor spin?
No
Check continunity of interlock switch with hood down at p7. Is there continunity?
Yes
Replace MC PCB.
No
Repair/replace the hood switch or wiring
Yes
Yes
Troubleshoot AC.
No
Is AC correct to T1 of MC PCB?
Yes
Plug RJ11 from CPU PCB into MC test box. Does motor spin?
No
Replace control cable.
To make this check, use the MC test box to activate the spin voltage during test.
Yes
Yes
Is AC correct on Motor connection of MC PCB?
No
Do location LEDs move when wheel is rotated?
Yes
Troubleshoot Encoder system
Yes
No
Check wiring to motor. Replace motor.
Replace Main PCB.
Check wiring connection on P4. Check/replace capacitors. Replace MC PCB.
MC = Motor Controller.
MC Test Box # 8112078

***Balancer Does Not Brake (Solid State Motor Controller Model)**


Balancer must spin and displaying information to proceed.
Does wheel attempt to stop?
Yes
Does an error message appear?
Yes
Cross reference error message to table and troubleshoot from the given location.
No
No
Do readings appear on display after wheel has stop?
Yes
Use MC test box, will motor spin & stop?
No
Test Comm. cable. Replace Motor Controller
Yes
Test Comm. Cable. Replace the Main PCB.
No
MC = Motor Controller.
MC Test Box # 8112078

PCB Checklist Addendum

Hennessy has noticed a considerable increase in the amount of NAD's (No Apparent Defect) for the 950/1050 PCB's (8111886). Most NAD's are in the "Chasing Weights" category. The next reason for PCB return is due to the Motor Controllers failing. Some of the PCB's returned tested OK. Below is a quick test to help determine if the PCB is defective. This test does not pertain to any other PCB's.

Remove PCB from Touch Panel.

Tools Needed: Digital Multimeter with leads.

Diode Test

Using a multimeter, set the function indicator to the diode function and check Diodes D9 (Rev D boards) and D10/D11 (Rev E and above) to see if they are shorted. Perform the following procedure for each diode.

1. Connect the multimeter's black lead to the left side of the diode and the red end on the right. If the diode is good, you will hear a short beep and the reading on the meter should be between .5 and .7, (if you're using an Ohmmeter the reading will be about 5 Meg Ohms (Ω)). If the diode is bad, you will hear a continuous tone and the multimeter reading will be 0 (same for ohm scale) unless it's open - no tone reading.

2. Next, switch the multimeter leads. Connect the black lead to the right side of the diode and the red lead to the left. In this configuration, your multimeter should read an open (OL), if the diode is good (same for Ohmmeter). The multimeter display should look the same as it does when the leads aren't connected to anything. If the diode does not read open, in this step, then it is bad.

IC Test

Use a multimeter to check for ground shorts on IC's (U8, U12, and U19).

1. Set the multimeter up for continuity (or diode) checking.

2. Connect the common lead of the multimeter to a ground point on the PCB. A good place is the negative end of capacitor C15 or C16 (see fig.1).

3. Take the multimeter positive lead and check the pins on the IC's above.

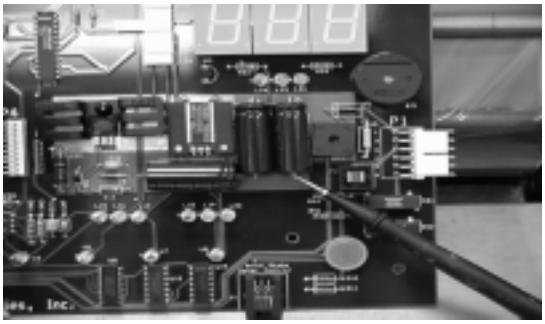


Figure 1 - PCB 8111886

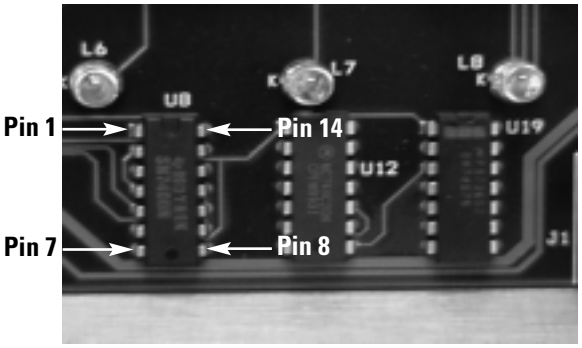


Figure 2 - Pin Configuration

Note:

- **Pin 7 is GND** on the IC's. (You will hear a continuous beep).

- **Pin 14 is VCC** on the IC's. (You will hear a short beep or read .5 - .7 on the Diode Scale.) This is OK. Only if you measure 0 Ohms or hear a continuous beep is the IC bad.

- **IC U19, pins 7, 11, 14, and 13** are the only pins where you should read 0 Ohms or hear a continuous beep.

If any other pins (not listed) are shorted to ground, read 0 Ohms, or you hear a continuous beep on the IC's listed above, THE PCB IS DEFECTIVE. DO NOT INSTALL PCB BACK INTO THE BALANCER.

If the IC's and the diodes check out OK, but the PCB does not display any lights, THE PCB IS DEFECTIVE. DO NOT INSTALL PCB BACK INTO THE BALANCER.

Rev 1

*Glossary Of Terms

Accuracy Check - Also referred to as Plane Separation. When a weight is placed on one side (plane) of a wheel the opposite side (plane) should not change.

Balancer Calibration - Also know as Weight Sensor Calibration. This process uses a specified size wheel and a 4 oz. weight to make sure the balancer giving the correct reading.

Distance Gauge Tape Placement - Also know as Optimizing A. If there is a problem with the accuracy check this is the procedure to correct the problem.

Hub Centric Wheel - A wheel that is centered to the axle by the center hole in the wheel.

Lug Centric Wheel - A wheel that is centered to the axle by the lug bolts.

Rotational Check - This is a procedure to verify if there is a problem in the balancer or the mounting of the wheel. This should be done with a Hub Centric wheel.

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